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Some Practical Observations ON THE INJURIES OF WAR.

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GUNSHOT FRACTURES OF THE BONES.

THESE injuries are so numerous, diverse, and extensive that the space of an article will not permit me to deal fully with the subject. The first question to decide is the necessity or otherwise of amputation. The subjects are usually strong and healthy, and conservative surgery should be the rule. In the many dubious cases where the reasons for and against amputation are about equal, the casting vote may be given on the side of preservation of the limb. Very hopeless-looking injuries may be remedied by the power of natural repair, especially in the upper extremity. I have had cases where portions of the shafts of the radius and ulna have been clean blown away and yet a forearm and hand preserved which, though unsightly, is yet of more utility than any artificial limb. I have also recently seen a case where fully six inches of the shaft of the humerus was shattered into pieces of all sizes and shapes. The skiagram presented appearances which looked hopeless, but the patient now has a firm and good union. When the shafts of the bones are shattered into the knee or ankle the outlook is very serious; in the case of fractures in the elbow or shoulder far less so.

Injuries of the main vessels and nerves and extensive destruction of the soft parts are arguments for removal. But in the upper extremity I have twice ligatured the brachial, or a large vessel like it, in compound fracture of the humerus with a huge extravasation of blood and still saved the limb. Enormous swelling and evidence of incipient gangrene, of course, calls for amputation. If it is determined to save the limb the question of removal of the shattered bone has to be considered. This is too often very extensive, the shaft being broken into many pieces for several inches. It is difficult to know what pieces will live and what will necrose and cause future trouble. I think it the safe practice to enlarge the wound and remove all small loose pieces of bone, but retain any large elongated splinters and flakes, particularly if they are adherent to periosteum. Small fragments of dead bone lead to obstinate after-sinuses, the new bone encasing them and leading to great trouble in the after-treatment.

The question of "plating" compound fractures is difficult to discuss, for much difference of opinion regarding its value exists even among surgeons of good operative experience and skill. Many, indeed, regard it with actual disfavour. In the early days of the war this operation was advocated enthusiastically as securing immobility of the fragments and preventing much of the agonies of transit. And from this point of view it would seem to have truly a great deal to recommend it. Then it was found that if done early in conditions of sepsis subsequent bone trouble arose about the screws. The latest opinion of the distinguished originator of this practice seems to incline to waiting until a certain amount of union has occurred and sepsis has largely disappeared, and then to divide the uniting medium, still sufficiently soft, approximate the ends of the bones, and plate them. In this case the operation would be confined to badly displaced fractures, which should not be common. But in such its value seems evident. Personally, I have not altered an opinion I expressed in writing many years ago, that the operative treatment of fractures should be reserved for exceptional cases and should only be performed by surgeons of good operative experience. In the few cases of fracture I have operated upon in the past I have drilled the bones and united them by stout silver wire with good results.

In all cases of gunshot fracture very free drainage and cleanliness are essential, counter openings being made if needful and the parts frequently flushed through large tubes. The "absorbent" dressings should be frequently removed. The greatest caution should be exercised in applying splints or bandages in the early treatment of these cases. It has to be remembered that a "smashed limb" would be a more accurate description of many of these injuries than a compound fracture. The lesions are of an extent and gravity I have seldom seen in civil practice. The exudation of serum is enormous, and any constriction of the limb which impedes the circulation precipitates gangrene. It is better to have in view the saving of the limb and life of the patient than to make vain attempts to adjust the bones accurately by forcible splinting and bandaging over swollen and inflamed tissues. If extension can be applied I most strongly favour it, and the limb placed in as good a position as possible and supported by heavy sand-bags. The wounds are not covered up and can be readily dressed. Should great swelling and threatening of gangrene occur, incisions should always be made and should be carried through the deep fascia. This proceeding may often save a limb, and I have noticed that this important measure is not lost sight of at the front. I have recently treated some severe cases of gunshot fracture of the femur by heavy extension and support with sand-bags with excellent results, the shortening being slight and the union firm. The skiagram of a badly smashed long bone is very disquieting to the inexperienced, and would be a certain factor for substantial damages if shown to a jury in a court of law. A slight overlapping of these fractures is common, but the unsightly "spiky" ends, bad as they appear in an early skiagram, become softened and "rounded off," and the ultimate results are far better than the early appearances would lead one to believe. It is certain that alarming appearances shown by the skiagram do not of necessity mean a useless limb afterwards, and utility of a limb is the principal thing to be aimed at. One of the great troubles in these cases of "smashed" bones is the persistence of sinuses, and the after slow elimination of fragments of necrosis. Though the surgeon may have taken the utmost care to remove all small fragments, some pieces will escape him. Or, by a pardonable error of judgment, he may leave fragments expected to unite which afterwards do not join as he anticipated, or necrosis of the ends of the bones may ensue. Sepsis, burrowing abscess, and sinuses with necrosis are particularly troublesome in deeply seated smashed bones. Several desperate cases of compound fracture of the pelvic bones have been successfully dealt with, but at an expense of repeated operations and time extending over many months. These cases are trying to the surgeon, nurses, and especially to the patient. In cases where the sinuses long persist, in spite of the use of the curette, a definite sequestrotomy must be performed when the shaft has sufficiently strongly united. Skiagrams will give an indication of the extent and position of the necrosis. These operations, from the amount of cicatricial tissue present and matting of the parts, are very difficult, and with the boldest operating may fail in removing deeply encased sequestra. An additional difficulty in cases of gunshot or shell fracture is the frequent multiplication of injuries; a man with a smashed femur may have also a badly fractured humerus and an extensive flesh wound, great masses of muscle being "blown away." Rigid splinting of such cases is well-nigh impossible, and the energies of surgeons and nurses must be devoted to saving life and to getting the bones to unite in as good a position as is feasible. Those who criticise unfavourably the final results of these formidable cases are those who have had no experience of them.

So soon as the condition of the parts will allow of it massage must be energetically resorted to. The neighbouring joints must be moved and the matted tendons exercised in their sheaths. On the thoroughness with which this is done depends the speedy restoration or otherwise of the functions of the limb. I do not think it safe to employ massage in the very early days of a fracture. The risk of displacing clots in the lacerated veins and causing pulmonary embolism is not imaginary. I have seen fatalities from this very cause. Massage of fractures, rather than rigid splinting, was energetically used in the wards of St. George's Hospital, especially in the practice of Sir W. Bennett. The results were so excellent I cannot sufficiently recommend it. The after-treatment of the stiff joints by mechanical exercises is of paramount importance.

I may close this too brief note on gunshot fractures by expressing my belief that a discussion on the operative treatment of fractures, after the war, by the surgeons engaged and the wide and varied experiences afforded would be very useful for the guidance of the profession in the future.

AMPUTATIONS FOR INJURIES OF THE LIMBS.

Many of the fixed operations of the text-books have to be modified by the ingenuity of the surgeon for the needs of the special case presented to him. In the foot and hand especially "trimming" operations may have to be invented, the flaps being taken from diverse situations. I have already published my belief that cutting a limb straight off without flaps in cases of gangrene or threatening gangrene is not good practice, but that thick flaps should be fashioned, left open, and allowed to drain. My views have been controverted, and I hardly like to be dogmatic. I can only suppose that conditions occur at the front I am not aware of or do not appreciate. If rapidity be aimed at, the old-fashioned transfixion operation is all that is needful. I have found the after-formation of a good stump in these unfortunate cases is not easy. In all amputations we should have in mind the needs of the mechanician and the application of artificial limbs afterwards. We should try and avoid presenting the surgical mechanician with conical, ill-formed, or painful stumps, most difficult for him to satisfactorily deal with and a source of misery to the patient. The "drawing out" and shortening of all main nerves at the time of amputation is a matter of the first importance if we wish to avoid painful "neuralgic" stumps. The cutting of too short flaps, with subsequent retraction and bone protrusion, is an error many of us have in our surgical careers committed. A good general rule is as follows. The long flap should be two-thirds of the circumference of the limb, at the point the bone is divided, and the short flap one-third. The edges of the flaps for two inches should be skin and fascia, the bases always of muscle. The covering of the ends of the bones with skin and fascia only generally leaves poor results. The cicatrix should always, if possible, be on the side or on the anterior or posterior aspect of the stump, and never over the ends of the bones.

The descriptions of amputations in the various text-books on operative surgery are innumerable, especially in foreign literature, and I will only venture to express my experience and advocacy of the operations I have found to give the best results in my own practice. Many of the described amputations of the foot, I feel sure, are of greater utility in the Examination Hall than in actual practice. The one bugbear in amputations of the anterior part of the foot is the action of the tendo Achillis, which persistently draws up the heel and causes the front of the stump to impinge on the ground, becoming tender and sore. Elongation of the tendon improves this condition certainly, but does not entirely cure it. I believe the two best amputations of the foot, as regards the after walking powers of the patient, are those of Syme and the sub-astragaloid amputation of Farabeuf. Anyone performing Syme's amputation for the first time or after a long interval of surgical inactivity will do well to note the exact lines of incision in the formation of the heel flap, and the importance of so dissecting this flap that its nutrient vessels, especially the internal calcanean artery, are left intact. Sloughing of the heel flap is the main risk of this operation, and is usually brought about by faulty operating. If the foot be removed about the level of the transverse tarsal joint, I have found it better to make the long flap from the dorsum of the foot rather than the sole. All the extensor tendons should be included in the flap. They adhere to the front and under surface of the stump, and the result is a marked power of extension, and counteraction of the evil traction of the Achillis tendon.

In the leg the operation of Farabeuf, by the long external flap of skin, fascia, and all tissues down to the bone, gives excellent results. The end of the tibia should be well rounded off, and it is especially important that the anterior tibial nerve be removed from the flap, or it will be laid right across the bones. The cicatrix is well away from future pressure. I believe I have in past practice performed all the different amputations through the knee, and think that of Carden to be far the best. If the femur be divided just at the base of the condyles, and the bone rounded off with pliers, no large bulbous end is left which so embarrasses the fitting of an artificial limb, and, moreover, the thigh stump is a long one. In amputation through the thigh itself the anterior flap should be the longer, and then the cicatrix falls behind the stump and line of pressure. If the thigh be so shattered high up as to necessitate amputation at the hip, I think it wise, in order to minimise shock, to cut through the soft parts as low down as feasible, the bone being removed by an external incision, and the periosteum preserved as far as possible. The hæmorrhage can be checked by ligatures of the common femoral or by the method of acupressure of the anterior flap. This is an excellent procedure, and I believe was first advised by Mr. Lynn Thomas.

In the upper extremity in cases of laceration of the hand one or more of the digits, especially the thumb, should be preserved if possible. Here the so-called "trimming" operations are advisable. All the other amputations of the forearm and arm should obey the principle of making one flap longer than the other, so as to bring the cicatrix well away from the end of the bones, and the flap must not consist of skin and fascia only. It is especially important to draw out and remove the main nerves, for in the upper extremity "neuralgic" stumps are only too common.

The amputation at the shoulder-joint should be avoided if possible and every effort made to preserve even a very short stump, as this much aids the surgical mechanician afterwards in fitting on an artificial limb. I have had no experience of the implantation of bone in this locality, and do not know the after-results.

QUESTION OF ANÆSTHETICS.

I hold to the belief that in civil practice no one anæsthetic is applicable to all cases, and that selection should be made according to the type of patient, the condition of his heart and lungs, and operation to be done. In the exigencies of military surgery chloroform is perhaps the best general anæsthetic, and men who are ill or weakened by wounds take it remarkably well. In the hospital I assist at chloroform has, I believe, been universally administered. The preliminary injections of morphia have not been employed. The anæsthesia has been very satisfactory.

THE LATENCY OF ORGANISMS.

I use this term for want of knowledge of a better one. It is to express a condition which was rather new to me, but which has been forcibly impressed upon my attention by the experiences of recent practice. It is a remarkable fact that pyogenic organisms may lie for months dormant in a healed wound, and yet be capable of doing serious mischief if the parts be opened by a fresh operation. A typical case was as follows. A healthy young soldier had a bullet embedded in the humerus, just below the shoulder-joint. The wound of entry had healed soundly for nearly six weeks. The operation for removal was unexpectedly difficult. The pectoral muscle had to be divided, and the vessels and nerves retracted, when the bullet could only be removed from the humerus by considerable force with an elevator. The utmost care was taken in the operation and I am certain no septic elements were introduced. The muscle was united by catgut and the parts well drained. To my surprise the case did very badly. All the newly cut surfaces became infected, and the man was seriously ill for some weeks. Moreover, the pus became of a greenish colour, and yet Dr. Solly, who was good enough to examine it, could not detect the *Bacillus pyocyaneus*. I have noticed a green or bluish discolouration of discharge in several "bullet cases." The patients themselves maintain that it is due to some poisonous substance upon the bullet, but I am unable to explain it. I found on inquiry that an outbreak of fresh sepsis in operating at the seat of healed wounds had been experienced by others, and that the newly-cut surfaces in the vicinity of an old wound were very apt to become thus infected. This is probably the reason why it is wise to postpone for some months operations on nerves, "secondary" excisions of healed stiff joints, and especially the forcible "breaking down" of adhesions in joints which have been the seat of septic arthritis. The clinical phenomena of these cases were new to me; the subject is a very interesting one, and has its analogy in the vegetable kingdom, where seeds may lie even for years dormant, and are yet ready to start into activity in favourable conditions. Exactly how the organisms are imprisoned I do not know; whether collections of them are securely

enclosed in scar-tissue or dominated by leucocytosis. But the clinical fact is certain, the practical importance great, and laboratory experiments on this matter could not fail to be of utility and interest. I have recently taken pains to wash out, and treat with pure tincture of iodine, the actual cavity or recess left after removal of a piece of shell or bullet.

GENERAL TREATMENT OF THE WOUNDED.

I have alluded to the importance of dietary and exposure to air and sun in these cases. The use of tobacco in moderation has seemed to me of great comfort to wounded men, and I have no doubt it acts as a nerve sedative of value, especially in persistent pain. But I am disposed to condemn the excessive cigarette-smoking prevalent among convalescent soldiers, and I think it should be stopped by the medical officers in charge. I have observed that want of occupation is a considerable trouble among the slightly wounded or nearly convalescent men. Want of occupations of a healthy nature for the men is a great difficulty in city hospitals, and is another drawback of them, and I do not see how this is to be remedied. But in convalescent institutions, at all events, it is better for a soldier to peel the potatoes than to smoke cigarettes on a bench! Light garden work, helping on farms, carpentry, the care of animals, and such-like occupations should be carefully thought out, organised, and instituted. And though the denizens of cities may find such occupations less congenial than tea-parties, cinematographs, or the attractions of music-halls, they are infinitely better for recovery of their health and strength, and obviate the dullness of country residences.

CONCLUSION.

A reflection on the lessons taught by the experiences of the wounds and injuries of this war would lead me to the belief that assisting and furthering the reparative powers of the individual is at least as important as any special remedial applications. Confusion of cause and effect is one of the common errors of life. It is particularly common in our profession and the public always fall into it. Because a simple bullet-wound, for instance, is found healed after one application of a special dressing the credit is given to the dressing and not to the reparative powers of nature.

I think we have a great deal to learn about septic infections, especially mixed infections, and it is unwise to be too dogmatic regarding them. The whole subject needs fresh investigation and study. The practical abolition of tetanus and its horrors by serum injection is a veritable marvel, and opens up great possibilities for the future in the prevention of severe sepsis. I have been immensely struck with the difference of the type of septic infection in this war to that I was familiar with in my very early student days. Amongst all the terribly foul and septic wounds I have lately treated I have not seen a single case of the old-time pyæmia, I mean of abscesses in the joints and viscera, with a jaundiced skin, subcutaneous hæmorrhages, and gradual, progressive, and certain failure of the vital powers. This is, to me, very remarkable, and I do not attempt to explain it. In carefully following all that has been written by others I feel sure that we need a more close and cordial coöperation between laboratory experiments and clinical results and observation, and between bacteriologists and clinicians. It is also worth calling attention to the fact that what may be called the surgical aftermath of this war will be laborious and extensive. This will especially be the case in orthopædic surgery, the divisions of tendons and fascia, with manipulations, massage, and mechanical exercises. Skilled electrical treatment to disused muscles will be of great utility. Funds will also be required for special "surgical boots" and limb supports, as well as for artificial limbs. The large class of nerve injuries will need much attention, and if repair of the nerves be impossible the various operations of nerve substitution will have to be considered and performed. The "rush" of severely wounded now makes us concentrate all our energies on immediate necessary treatment. But the completion of treatment of many of these cases is a matter of time, patience, and care, which may be well expended in bringing the patients into conditions where they may follow some useful employment.

Finally, I may state that very excellent results can be accomplished even in hastily improvised hospitals, scantily equipped, and with largely amateur nursing. Surroundings of marble, of ventilating fans, and other surgical luxuries are not superior to correct surgery and strict cleanliness. On the contrary, I believe that an open-air hut hospital would offer advantages over any more confined building, even if fitted with all the costly surroundings supposed to be essential to antiseptic surgery.

The preceding article merely deals with the experiences similar to those afforded in any of the many hospitals scattered through the land. I have not chosen or related rare injuries, though some few have come under notice. If the remarks regarding the use of antiseptics in septic wounds are at variance with some of the leading authorities, I wish to express that I differ from them with all diffidence, and with the conviction that the relation of clinical experience is of great value in determining safe and reliable schemes of treatment.

THE ELECTRICAL TREATMENT OF THE WOUNDED.[1]

BY W. J. TURRELL, M.A., M.D. OXON.,
MAJOR, R.A.M.C. (T.).

THE treatment of wounded soldiers by electrical methods appears to have been first systematically practised by the French in 1907 during the Morocco War. Two very interesting articles dealing with this subject have appeared in the French medical papers. One of these, entitled "The Physiotherapy Department of the Military Hospital at Dey in Algeria," by Dr. Hirtz, appeared in the *Archives d'Electricité Médicale*, March 10th, 1913; the other, entitled "The Physiotherapy of those Wounded in War," by M. Miramond de Laroquette, was read before the Congress of the French Academy for the Advancement of Science held at Tunis in 1913.

It is interesting to note that Dr. Hirtz holds strong views on the importance of the independent control of physiotherapy departments. "The department of physiotherapy," he says, "forms a division self-governing in the same way as a department of medicine or of surgery. It was only by degrees that we obtained this independence, and we attach great importance to it. It is only under such conditions that good and exact work can be done. Each department is thus rendered responsible for its own work." The physiotherapy department comprised a subdivision for electrotherapy, one for radiology, and one for mechanotherapy. The number of patients treated during the year 1913 amounted to 323. Dr. Hirtz remarks that, as is usually the case, the greater part of these, that is 236, fell to the lot of the electrotherapy department. The cases treated by electrotherapy included articular rheumatism, acute or subacute, neuralgia, neuritis, paralysis, functional troubles caused by wounds, synovitis, arthritis, and hydrarthrosis. The 236 cases required 12,543 individual séances. The cases treated by radiotherapy included cervical adenitis, arthritis, certain maladies of nervous origin, and superficial tumours. Chronic effusions into joints were treated by pastille doses of X rays once a fortnight. The success of the department led to the formation of similar establishments in all the large French military hospitals. Both the above writers claim that without the aid of physiotherapy the number of those permanently disabled and in receipt of State pensions would have been much increased.

The fully equipped electro-therapeutic department at the Radcliffe Infirmary, Oxford, opened in November, 1913, was in full working order at the outbreak of war. We were therefore able to avail ourselves of its services on the arrival of the early convoys at the 3rd Southern General Hospital, of which hospital the Radcliffe Infirmary forms a section. It will probably facilitate discussion if I give a brief outline of the electrical methods adopted in our department.

As regards results it is, of course, absurd to compare those obtained at the physiotherapy departments at base hospitals, which are regarded by some unenlightened medical officers as the dumping ground for all obstinate or incurable cases, with the results obtained at command depôts, to which only those cases likely to be fit for foreign service within six weeks are usually sent. We rely a good deal on ionisation. Except when treating wounds or mucous membranes we do

[1] A paper read before the Section of Electro-Therapeutics of the Royal Society of Medicine on Nov. 17th, 1916.

not attach any importance to the specific action of any special solution, but invariably use a 2 per cent. solution of common salt. We make use of large pads, strong currents, and séances of as long duration as the time of the department will permit. Cases treated in this way include subacute and chronic rheumatism, some cases of neuritis, impetigo, sycosis, septic and indolent wounds, stiff joints, &c. Where the limitation of movement in a stiff joint is due to fibrous bands or adhesions ionisation is often very useful; in these cases massage and manipulation should be performed as soon as possible after the conclusion of the electrical séance. Where the stiffness of a joint is merely due to cold and rigidly contracted muscles, immersion of the limb in hot water for 20 minutes at a temperature of 115° F. will probably be all the treatment preparatory to massage that is required. If expense and space are of no consideration the water may be kept continually agitated by spouting jets (the eau courante system) or by a motor-driven propeller (the whirlpool bath system), and thus the molecules of water, cooled by radiation to the limb, are constantly replaced by hotter molecules. The consideration of this refinement, however, more properly belongs to another section.

The treatment of indolent wounds and ulcers by zinc ionisation gives excellent results; after about two or three treatments by this method I now change to ultra-violet radiation from the tungsten arc and obtain more rapid healing. The ionic medication of foul, extensive, and sloughing wounds with the chlorin ion quickly allays the odour and leads to rapid healing with smooth flexible scars and free movement in the surrounding tissues. I believe that this class of case is far too rarely sent to the electrical department for treatment.

In addition to the electrical department I have charge of 60 surgical beds; I have, therefore, had an opportunity of trying this method on early cases. The first case I treated in this manner was a patient with a gunshot wound of the forearm, received at the range of only one or two yards. Selous, the big game hunter, has, I am told, pointed out that a bullet striking a limb at a very short range has a similar effect to that of an explosive bullet. Anyhow, this man had a small bullet wound over the interosseous space about the middle of the extensor surface of the forearm, and nearly the whole of the skin and superficial tissues on the flexor surface of the forearm were replaced by a foul, sloughing, very offensive mass; there was no fracture and no nerve lesion. The wound was treated the day after admission by chlorin ionisation; in 24 hours all offensive odour had ceased, and in two or three days the wound was quite clean, and, I think, in six or seven weeks the patient was discharged to light duty with the wound healed, a very flexible scar, and perfect movement in wrist, hand, and fingers. Probably many have had equally successful results with this treatment, and I do not bring this case forward solely to show the success attending this method, but because of an unaccountable rise of temperature which suddenly occurred about the sixth day with no symptoms and no physical signs, the wound remaining perfectly healthy in appearance. The temperature reached to about 105° F., and subsided in two or three days. This case occurred early in the war. I have had another very similar case with a higher range of temperature, reaching to 106° F. This case was also a wound of the forearm similar to the one I have described, but not quite so extensive nor so foul. It was similarly treated, and there was nothing in the wound or its neighbourhood to account for the pyrexia. A blood culture gave a negative result. I shall be extremely interested to hear if any have experienced these alarming rises of temperature in the treatment by ionisation of extensive superficial and sloughing wounds. I have not experienced any similar rises of temperature when treating deep suppurating wounds and sinuses, however septic they might be.

Many superficial wounds in my wards have been treated by hypertonic solution, but neither in theory can I see that the osmotic pressure of these concentrated solutions can be so effective as the ionic exchange excited by the application of the galvanic current, nor have I found in practice the use of hypertonic in any respect as effective as ionic medication. Hypertonic solutions are certainly more easily and readily applied than ionic medication, and therefore have a large sphere of usefulness in the treatment of septic wounds.

Recently we have been trying Dakin's tubes with Dakin's solution in the treatment of deep cavities associated with bone lesions and necrosis, and have obtained good results by this method. The treatment, however, seems to require a special kind of wound if the best results are to be obtained. The ideal wound is a deep sulcus in which the fluid may collect, with no sinus leading off and no counter-opening. The sinuses are apt to develop an air or pus block and so prevent the permeation of the fluid. Ionic medication is more penetrating in its effect and is not so affected by these local conditions.

Nerve injuries, contusion, concussion, compression, and section, partial or complete, form a large proportion of the cases that are sent to the department for treatment. If the nerve reacts to the faradic current we utilise a rhythmically reversed faradism from a coil of low coefficiency, and in this we follow the generally recognised practice. When there is no reaction to faradic stimulation there is not the same consensus of opinion in regard to the choice of treatment; some prefer condenser stimuli, some the sinusoidal current, and others rhythmically reversed galvanism. Of these the last mentioned is the simplest and cheapest; it is, moreover, quite painless and very efficient. We are told that when a nerve is severed or otherwise rendered functionless the muscles which it supplies hang flaccid, like hammocks from their attachments; waste and toxic products accumulate within their substance; fatty degeneration takes place; and, finally, if untreated, conversion more or less complete into fibrous tissue occurs; so that by the time the nerve has regenerated the muscle has lost all contractile power. Our object in treatment is therefore to maintain the nutrition and contractility of the muscle while the nerve is undergoing the process of regeneration. The sudden sharp contraction elicited by the rhythmically reversed galvanic current seems to me the ideal one for the removal of these waste and toxic products and for the maintenance of the muscular tone. We follow out the technique advocated by Bergonié for the treatment of infantile paralysis, and feel satisfied that we are in good company in following the lead of a teacher to whom electro-therapists owe so much. This treatment is so simple in its application, the apparatus needed is so inexpensive, and the results obtained are so good that it is deplorable that it is not more generally adopted at the smaller hospitals and convalescent homes. We have all seen limbs permanently disabled by neglect or inefficient electrical treatment the function of which could have been more or less completely restored if the proper methods had been followed. At nearly all hospitals and convalescent homes, however small, there is usually some form of apparatus for the supply of the continuous current, and only the addition of a clockwork metronome, costing about £2, together with a little instruction and occasional supervision of those in charge, is needed to ensure the recovery of many cases which, if neglected, will become a permanent charge upon the State.

I do not intend to deal with the subject of muscle and nerve-testing beyond laying stress upon the importance of associating the examination of the voluntary movements and sensation with the electrical reactions. Although we are all ready to admit the importance of this in theory, in practice we are apt to neglect it, unless we methodically associate them. In order to coördinate these observations, and to keep a record of them, we make use of a card. (The card was exhibited.) Bergonié's apparatus for the production of electrically provoked exercises we find most useful in restoring the tone of muscles wasted from disuse or slight nerve disturbance. We have recently been extensively using it with great success for the development of the quadriceps extensor after surgical removal of the semilunar cartilage.

Electrotherapy, like other methods of treatment, has usually failed in most cases of severe shell shock; many of these cases have very marked electrophobia, and electrical treatment then tends to aggravate their symptoms. There is, however, one class of nerve shock in which the Bergonié treatment generally results in a speedy cure. These are the cases which are under the fixed impression that they have lost all power in their lower limbs, and are unable to walk or even to stand up. One or two vigorous séances on the Bergonié chair are usually sufficient to convince them that there is still some contractile power in their muscles, and they are then soon able to stand and walk without assistance.

The chief indication for the use of diathermy in the treatment of the wounded is the existence of severe pain; unfortunately this is an indication which frequently arises.

The hyperæmic changes induced in the tissues by the passage of the diathermic current are of great value in the treatment of conditions where the local nutrition is at fault. The high rate of oscillation of the electrons in the tissues excites tissue drainage as well as producing frictional heat. It has several times been pointed out how completely and efficiently diathermy fulfils the indications for treatment in trench feet, relieving the pain when all other means have failed, reducing the stasis and congestion of the parts by tissue drainage, and diminishing to a minimum the loss of tissue. The results claimed for diathermy in this treatment have now been confirmed by many workers.

Volkmann's ischæmic contracture exhibits symptoms which seem to indicate the application of diathermy. I have treated three such cases by this method. Two were very advanced when they came under my care, and were not in the least benefited. The other was an early case and the progress of the disease was arrested, and very marked improvement took place.

Two interesting cases of local tetanus have shown marked symptomatic improvement under the influence of diathermy. One of these was sent to me by Major A. F. Hurst to have his reactions taken. The muscles of the left shoulder were rigidly contracted, exhibiting an almost incredible degree of stony hardness. To take the electrical reactions of muscles in such a condition was clearly an impossibility. The patient had previously taken an anæsthetic very badly, so I decided to try the effect of diathermy. The application of this current resulted in a degree of relaxation far greater than that obtained from any other application, and even slightly greater than that obtained some days later from complete anæsthesia. The relaxation lasted for some hours and rendered the taking of the reactions quite a simple matter.

The other case occurred in the muscles of an officer's leg. Diathermy was regularly applied, and definite relief was experienced after each treatment. I received recently the following letter from this officer, in which he very clearly describes his symptoms and the effect of the treatment:—

15/11/16.

DEAR MAJOR TURRELL,—I have been meaning to write to you for some time, as I knew you would be interested to hear how I was getting on. Your letter has just been received, and I am only too happy to give you any information I can with regard to my leg.

I was wounded in the left leg on Oct. 13th, 1915, by H.E. shell, and arrived at Oxford on the 22nd. There was no operation, as the surgeon in charge did not consider it advisable to remove the pieces of shell; my leg seemed to be getting better and after about a month I was able to hobble round with sticks. My foot at this time used to swell a great deal towards night, and the foot seemed then to gradually stiffen up with violent pains at intervals; this gradually spread up the whole leg to about the knee, and I was compelled to take to my bed again. The pain at times was very bad, similar to a very bad attack of cramps, and then my leg became rigid and stiff, and at other times used to get horrible jumps and it was impossible to keep it still, and whenever the doctor or nurse looked at it, it used to stiffen up at once. The night seemed to be the worst, and consequently I got very little sleep. I often had to get up in the middle of the night on crutches to try and obtain relief, my leg was so cramped and sore. It was about this time that you first visited me and prescribed a course of electric treatment for my leg, and I shall never be able to thank you enough for the relief it gave me. I cannot remember the names of the different treatments, but the first one—diathermy or heat pads—certainly relieved the pain, and after the first two or three visits to you I got immense relief. I never looked back after this, and although the progress was slow I gradually lost all pain and was able to get sleep at night. The nervous jumps slowly disappeared and my leg became gradually normal except for contraction of the tendons. I was unable to straighten my ankle or knee, and it was thought at one time that my tendo Achillis would have to be severed. Gradually the knee straightened and I was able to get my heel to the ground. I was for some time on crutches and was able to leave the hospital on Feb. 5th, 1916, walking with sticks. ..... I am now able to walk comfortably, but am unable to flex the ankle more than at right angle to my leg. The circulation is not very good and I feel anything tight round my calf. I am still getting Boards and have not been passed fit for overseas yet.

This officer was treated by ionisation on Dec. 6th and 7th, 1915; diathermy from Dec. 7th to 22nd, 1915, also occasionally static breeze; and ionisation, chlorin ion, to relieve contraction, from Dec. 29th, 1915, to Feb. 4th, 1916.

Of course, the treatment of such cases by diathermy is purely symptomatic, and in no way replaces the need for antitoxic serum or other specific treatment. The treatment is, nevertheless, a very important one in these cases, both on account of the immediate relief which it affords and also on account of its tendency to prevent the permanent muscular shortening or contraction which has been found likely to result in these cases.

In relieving the pain of sciatica, neuritis, lumbago, and many like conditions diathermy is of the greatest value. In dealing with sciatica I have practically abandoned all other methods of physical treatment, early cases quickly are cured, some old-standing ones require much perseverance and patience, and occasionally one comes across a case which shows no improvement. Electrotherapy would be an uninteresting and a tame proceeding if we had all successes and no failures. The mistake which I have most often made in dealing with these obstinate cases has been in chopping and changing from one treatment to another. I believe that if sciatica will not yield to diathermy no other electrical method will benefit it, unless, perhaps, radiotherapy. As a preliminary to the passive movement of stiff joints the analgesic effect of diathermy and its influence in diminishing the spasmodic contracture of neighbouring muscles are of great service.

In no other electrical modality is technique of such importance as in the application of diathermy. The chief points to pay attention to are:—1. To apply the current slowly. 2. To be careful to apply it in the right direction and over the right area. 3. To continue its application for a sufficient time—a minimum of 15 to 20 minutes. 4. To obtain as great a heating effect as is consistent with safety. 5. To select the size of pad and electrode suitable for the extent of area to be treated.

It is quite easy to treat cases by diathermy without producing any benefit; it is also possible by correct technique to cure these cases. For instance, take that most troublesome complaint, coccydynia. By following the routine method, and placing one electrode on the abdomen and the other over the sacrum and coccyx, and giving the usual dose, probably no improvement will result. On the other hand, by adopting a more intensive method most cases can be cured. The patient lies on his abdomen, a cylindrical metal electrode is placed in the rectum, and a small pad and electrode about the size and shape of the coccyx is placed over that bone, and the current slowly administered to the toleration of the patient. I have personally cured five or six cases in this way; the last was a coccydynia in a wounded soldier following a contusion of the spine.

The high-frequency vacuum tube we find useful in some conditions of trench feet and other painful conditions; ultra-violet radiation is to some extent replacing the use of this modality in our work.

One of the most useful and indispensable forms of apparatus in the treatment of wounded soldiers is the static machine. The equipment of no electrical department is complete which does not include an efficient instrument of this kind. The unidirectional current of the static machine, with its enormously high potential and its minute ampèrage, can be produced by no other form of electrical apparatus; and it is the possession of these specific properties which renders it capable of producing results in certain cases which are unobtainable by any other means. We know from our condenser testing that the vigour and amplitude of a muscular contraction depend chiefly upon the voltage used. In a healthy muscle with the condenser charged at 50 volts, we get a weak muscular contraction; with a condenser of similar capacity but charged at 100 volts, a stronger contraction results; and a more vigorous contraction still is obtained from a charge at 200 volts. Now with the Morton wave-current of the static machine the muscles to which the electrode is attached require a potential of several hundred thousand volts before a discharge can take place across the 7 or 8 inch spark-gap, which is often used. So vigorous and of such amplitude is the resulting muscular contraction that we are enabled by this method to free muscular fibres from involvement in scar-tissue by the force of their own contraction. So readily and accurately can the force of this contraction be regulated that, by alternately widening and approximating the discharging balls, we can make use of this current as a form of electrical arthro-moteur for the movement of stiff joints in the hands and feet, and as a means of breaking down slight adhesions. This method is especially useful for breaking down the adhesions which persist in trench feet after the subsidence of the acute and painful symptoms. In

the Morton wave-current these vigorous contractions alternate with periods of complete relaxation, and thus by a form of automuscular massage the stasis and congestion of recent sprains are removed, and the return of mobility and function is often hastened by several days or weeks. In the same manner, with suitable technique, the re-absorption of the fluid in synovitis of the knee-joint can be rapidly promoted. A full understanding of the *modus operandi* of this modality is necessary to enable us to appreciate in what a large number of cases, resulting from wounds and exposure, it is applicable. There is no form of electrical or other apparatus by the use of which quicker or more permanent results can be obtained. I hope that we shall presently hear Captain Humphris's remarks on this treatment, for on account of his much longer experience he is able to speak with far more authority on these matters than I am.

I have so recently read a paper on the ultra-violet radiation before this section that I do not propose to detain you with any remarks of mine on this subject, but we shall be very pleased to hear the experience of others with this treatment.

To summarise very briefly, the war services which electrotherapy can render to the State are as follows:—

1. A considerable number of those who would otherwise remain permanently unfit can be rendered fit for general military service.

2. The severe pain of many of those wounded or injured by exposure on military service can be completely arrested or greatly relieved by these methods.

3. Electrical treatment is of great service in many of the less serious cases, often effecting a speedy cure and a quicker return to the fighting line.

4. Electrotherapy, fully and efficiently developed, will result in a very considerable reduction in the amount paid for State pensions, and, what is far more important, will restore function to many crippled limbs.

The last point we have to consider is the personnel of the staff of the electrical department, and this, though perhaps the most important point of all, I must deal with very briefly. A great deal of the electrical treatment administered at many of the convalescent homes and smaller hospitals serves no other purpose than to bring the treatment into disrepute. One frequently sees, as I saw to-day, a patient with complete reaction of degeneration of the musculospiral nerve who had been treated in a perfunctory manner for five weeks with the faradic brush, with no other result, of course, than to destroy completely the patient's faith in all electrical methods. Under the present system with about two months' training and the possession of a small faradic battery anyone can become a so-called medical electrician, and practise as an expert the most specialised of all the medical sciences. I think that this condition of things could be largely remedied by appointing properly qualified electrotherapists to supervise and instruct in electrical methods in the different hospitals and convalescent homes in their area. Of course, the more important treatments, such as diathermy and the static, would have to be conducted at properly organised and equipped departments. But, nevertheless, under proper supervision and control an amount of work invaluable to the patients and the State could be performed in the auxiliary hospitals by means of ionisation and rhythmically reversed galvanism.

These suggestions are made in no carping spirit, but with a full recognition of the very valuable services which are being rendered by only partially trained nurses and masseuses, and they are made with an earnest desire to increase the usefulness of these ladies and to extend the benefits of efficient electrotherapy to regions which they have not yet reached. This section cannot fail to feel otherwise than much gratified at the development which has occurred in electrotherapy during this war and at the increased recognition which it is daily receiving.

DONATIONS AND BEQUESTS.—Among other bequests the late Mr. Peter Brock, of Treesbank, Cambuslang, has left £1500 to the Western Infirmary and £1250 to the Royal Infirmary, Glasgow.—The late Edward George Henry Montagu, eighth Earl of Sandwich, has left £1000 each to the Huntingdon County Hospital, the Dorset County Hospital, and the Royal Hospital for Incurables, Putney.

FRAUD AND SKIN ERUPTIONS.

BY SIR JOHN COLLIE, M.D. ABERD.,
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LESIONS of the skin may be produced in many ways; even simple rubbing with a wet finger, if persistently carried out, will raise an erythema. This, however, is a somewhat tedious method, and it is sometimes found that friction with the moistened end of a match or persistent pricking with a needle is resorted to, since these plans are quicker and more efficacious. Other methods are the application to the skin of a too hot water-bottle, of carbolic acid (frequently employed since it is very easily obtained), or of agents such as cantharides, mustard, "mustard leaf," or croton oil, all of which blister and may even produce superficial ulceration of the skin. More serious injuries, deep ulceration and gangrene, which are sometimes found, are generally produced by the application of strongly caustic acids or alkalies. One feature of these skin eruptions is that often a succession of diseased areas arise.

Dr. McKendrick, of Edinburgh, has kindly sent me a note of the following case.

A girl who had undoubted syphilis and a secondary eruption was about to be discharged from the Edinburgh Royal Infirmary when a fresh crop of eruptions suddenly appeared which was not characteristic of the disease. It subsequently transpired that some of the areas were produced by pinching the skin with the finger-nails, some by rubbing and scratching, and others by the application of heat. The hands were tied up and the whole rash disappeared.

Seven years later the same girl was brought to the surgical X ray department of the same infirmary by the matron of a home for destitute girls, with a report that the girl had swallowed a large number of ordinary pins. X ray examination was negative, and Dr. McKendrick, who, fortunately, remembered the girl's face, and said so, obtained from her the confession that she had not in fact swallowed any pins.

The case betokens a peculiarly twisted mental attitude and a moral obliquity which is interesting.

Nature of the lesions.—These lesions appear suddenly and at irregular intervals; they may be single or multiple. There may be a simple erythema, bullæ, or shallow ulcers; in rare cases severe, deeply-cut ulcers are found, or even patches of superficial gangrene. They have the following characteristics:—

1. The condition produced is unlike any of the usual skin diseases.

2. According to the usual geography of factitious skin eruptions they occur in situations easily reached by the right hand of the patient, if she is right-handed, or on the opposite side if she is left-handed. Such situations, for example, as the front of the arm and the forearm, and the thigh and the leg are favourite sites. The area between the shoulder blades cannot easily be reached and this is generally found to escape.

3. They avoid the neighbourhood of the mouth, nose, ear, scalp, knees, hands, and the genital region. The soles of the feet are also avoided, as an eruption there would impede locomotion.

4. The lesions often have a characteristic aspect. Usually they run longitudinally—that is to say, in the length of the limb on which they are inflicted. The shape may be curious and suggestive. Ulcers, for example, may be perfectly circular, and in such cases have been produced, in the case of crude imitators, by the application of a coin soaked in some irritant; or, more rarely, they may take the shape of parallel scratches such as might be produced by a fork.

Eruptions following a straight line are unknown in dermatology. Any patch of dermatitis, therefore, which follows a straight line for any part of its margin is suggestive of fraud. A suppurating, angry dermatitis in a more or less straight line may be produced on the outer edge of the left forearm by the simple process of persistent friction by the right hand. It is well to remember that one is apt to be thrown off one's guard by a very inflamed angry-looking patch of inflammation; instinctively, from preconceived ideas and association, the appearance makes one think of disease. Many cases have been recorded where blistering has been produced by the simple process of cutting off a small piece

of a mustard-plaster and applying it to the skin. The straight lines tell their own tale.

5. The surrounding skin is significantly healthy.

6. The alleged sensation of the part is usually abnormal; either the patient complains loudly of excessive pain, even when touched lightly, or else she professes to feel no pain when the part is freely handled.

7. The lesions sometimes have a way of appearing to order. If, for example, the examiner says in the hearing of the patient: "I should not be surprised if in the course of a few days we find an ulcer in such-and-such a place," the probabilities are that later an ulcer in due course appears there. Cases have been described where lesions starting at the periphery of a limb and subjected to the control of an occlusive dressing, such as a plaster-of-Paris case, have appeared higher and higher up the limb as the occlusive dressing has been extended.

8. Much assistance can often be gained by smelling the eruption. The characteristic smell of many acids can be recognised, and the case diagnosed at once. Litmus paper will often reveal an acidity which will at once arouse suspicion, for the normal exudation of a skin disease is alkaline.

In cases which are caused by hysteria other signs, such as stocking anæsthesia, and so forth, can usually be elicited, and an important point to be remembered in all such cases is that they are usually associated with anæsthesia of the palate.

Aids to diagnosis.—The diagnosis will be assisted by a consideration of all of the above points. It should be remembered that occasionally where a strong caustic has been used a drop may run down the skin and leave a pear-shaped mark below the edge of the ulcer, which is lighter in colour and shows a less intense inflammation than the primary lesion. The application of a proper occlusive dressing will often be found useful and will clear up any doubt that remains.

Dr. Edward Stainer, of the Skin Department of St. Thomas's Hospital, has kindly supplied me with a drawing the exact size of what he calls the "tell-tale trickle tail" which occurred in the left arm of a young housemaid, and was obviously produced by an acid. The central circular area was in a blistering condition with detached epithelium, surrounded with an irregular, erythematous border, the tail of a comma, as it were, representing the overflow of the acid.

Speaking generally, the flattened, sliding epithelium of a large blister in which there are no true pemphigus-like blebs, ought to make one suspect the possibility of artificial production.

Skin lesions, whether genuine or artificial, are often masked by a secondary dermatitis, which may be set up by scratching and the ingress of pyogenic organisms; these should be got rid of by the application of compresses and other suitable remedies. The character of the lesion depends not only upon the chemical employed to produce it, but upon the mode of its application; for instance, carbolic solution in certain strengths is an irritant, pure carbolic is an anæsthetic; an application of the former will, therefore, produce a dermatitis, the latter will whiten the tissues, and if the application is sufficiently strong will produce gangrene.

Many years ago, when I was in general practice, I was attending a patient for rheumatic fever. She complained bitterly of two painful spots in each buttock. Two small patches of whitened skin presented themselves, and I at once said, "These are burns with pure carbolic acid." The answer to the question whether a bed-pan was being used was in the affirmative. The trained nurse who was in attendance admitted, upon my putting it to her, that she was in the habit of disinfecting the bed-pan with carbolic solution. The fact that some pure carbolic had been unintentionally left on the utensil was perfectly obvious, but was denied. My patient, however, a woman of much intelligence, required no explanation. The nurse, who had had her lesson, was forgiven, and there the matter ended.

It is often very difficult to discover the means adopted to produce the artificial lesions, for obviously the patient makes it his business to conceal in every possible way the fraud which he knows he has perpetrated. A curious case occurred recently in which a circumscribed area of the skin in the forearm presented a suppurating pustular eruption upon an indurated base. The patient was a nurse in a hospital. The case presented many unusual signs, but the true nature of it was soon revealed (as it is in most cases when under hospital supervision) by the fact being disclosed that the nurse was a morphomaniac. She had inserted the hypodermic needle repeatedly within a small area, with the result described.

A somewhat rare but very interesting form of skin disease produced by artificial means is sometimes brought about by striking the skin vigorously with a hard brush, which produces a purpuric rash which has been called "hairbrush purpura."

There are physiological and psychological reasons which will suggest themselves to medical men why reasonable sane girls are found wilfully to produce troublesome, irritating diseases; but here we are more concerned with the class of case in which pecuniary advantage is likely to be gained. Sequeira states that the payment of £5 to a servant employed in a large institution as compensation for dermatitis, alleged to be caused by irritant soap and alkalies, led to a crop of similar cases coming under his notice.

As a rule, an artificially produced skin lesion can be fairly easily diagnosed; but, as Dr. Norman Walker reminds us, it is one thing to diagnose a dermatitis artefacta and another thing to prove it. In his "Diseases of the Skin" Sequeira gives the following note about the case of a young girl where the lesions were obviously self-inflicted:—

"The illustrative photograph shows the leg of a young girl in whom the lesions were remarkable for their arrangement in sets of three, all of the same length and equidistant. They consisted of rather deep longitudinal abrasions covered with dried blood and small crusts formed by dried exudation. Recent lesions and the stains of older abrasions are well shown in the photograph. The patient had complete anæsthesia of the palate and right hemianæsthesia affecting the face, limbs, and trunk with the exception of a spot the size of a shilling over the right eyebrow, where sensation was normal. It was suggested that the excoriations were produced by a three-pronged fork, but scratching by the finger-nails might have caused them."

Dr. R. O. Adamson, of Glasgow, reports the following interesting case.

The patient was a young lady of more than usually attractive appearance in whom he detected nothing suggestive of the morbid tendencies which she exhibited. The illness began with "weeping eczema" of the chin, which was followed by a similar condition on cheeks, forehead, nose, neck, arms, and later the thighs and legs. The condition remained in spite of incessant treatment, and often appeared in places covered by dressings and bandages. Each patch was at first an acute erythematous flush which rapidly suppurated and healed by the usual crust. Their shapes were various, sometimes round, often square, and not infrequently linear. They healed rapidly, but the feature of the illness was the succession of diseased areas. The condition made the young lady a prisoner in the house for many months, and this was borne with remarkable patience. Dr. Adamson remarks: "I confess the idea of the complaint being factitious never occurred to me. Those who have met with such cases for the first time may understand my want of imagination. I was supported in my sympathy for my patient by a skin specialist who diagnosed dermatitis herpetiformis."

In due course the lady went to a well-known spa and was treated by two or three doctors with no benefit. Eventually the case was diagnosed by a well-known dermatologist as dermatitis artefacta. A nurse was now sent in to watch the patient, but as after two months nothing was detected, fresh patches appearing, the friends of the patient were, with some difficulty, induced to send the lady to a nursing home where she was never left alone night or day, and was never allowed to leave the room for any purpose. On the fourth day a movement under the bedclothes led to the detection of the lady's hand holding most unsuspicious a handkerchief in which was a small ragged piece of pumice-stone. When deprived of this her cure was rapid.

Two years later the lady complained of much gastric pain and vomiting of blood. There was plenty of blood, but it clearly had never been in the stomach, for it lay as a pinkish layer at the bottom of a vessel of vomited milk. Notwithstanding her attitude was one of apparent *bona fides*, after a few days' careful watching she was informed that her illness was a feigned one, and so the matter ended.

A year later obstruction of the bowels was feigned, and constipation lasting a month was averred, the falsity of which was proved by another short sojourn in a nursing home.

Unfortunately, however, we often have to deal with the following much more difficult condition. Pre-existing skin disease is sometimes wilfully *aggravated and kept up* by patients who derive a monetary benefit from continuing disability. It is an easy matter, for instance, for one whose hands have become inflamed as the result of using at his work too strong a soap or too strong a solution of soda to keep up the eruption by the occasional surreptitious application of the irritants which have in the first place produced it. How often does one see an old ulcer kept going when, if properly treated, it should have healed. The only way to deal with such cases is either to apply an occlusive dressing, when this is possible, or to arrange for the patient to be under proper medical supervision in an institution.

Trade dermatitis.—In certain trades where irritants have to be habitually used dermatitis frequently occurs. The most familiar examples are the erythematous, raw-looking hands of those who habitually have to use strong alkaline solutions—for example, washerwomen, barmaids, &c. Hairdressers who use alkaline shampooing fluids sometimes suffer. Those who use aniline dyes, french polishers who use bichromate of potassium, grocers who have to handle sugar, carpenters working with teak and rosewood, tanners using arsenic, surgeons and nurses using disinfectants, painters using lead, masons working with silicate, photographers, and workers with chlorine, tar, and paraffin are also liable to disease. Bakers are subject to a special form of eczema, the result of constantly mixing dough. This used to be called "baker's itch," which was probably a form of scabies, the result of the introduction of an acarus from an inferior sort of sugar with which flour used to be adulterated. A worker may have been engaged for years in a particular occupation without his skin suffering, but from some indefinite condition, such for instance as a lowered vitality, or it may be the accidental use of a stronger solution than usual, the skin resistance gives way, and a dermatitis is set up. Even when the condition has thoroughly healed there is sometimes a tendency to recur in the event of a continuous exposure.

The characteristics of the lesions produced are that they only appear in the portions of the body exposed to the action of the caustic, and are, therefore, almost entirely confined to the hands and forearms. This is not, however, an absolute rule, for if the worker is engaged with caustics in the form of a fine powder or a vapour, other parts of the body, more especially the axillæ and groins, may be affected. It must be remembered that the clothing may become soaked in the irritant, and unexpected parts of the body may become affected. For instance, a case of acute eczema was recently found on both legs in a man whose occupation was that of cleaning down motor-cars; he used a crude form of paraffin, and his trousers had become soaked with it.

The various trades are responsible for an infinite variety of skin lesions. As a rule, they start with a simple erythema, followed by vesiculation, and eventually an eczematous condition is set up. When the process is chronic, we get the heaping-up of epithelium with formation of hard, horny skin, in which painful cracks are likely to occur. The backs of the hand, the tips and sides of the fingers, and the nails are usually first affected, the disease spreading up the arms as far as the irritant is able to obtain access. The difficulty of many of these cases is that they are so frequently masked by the secondary infection caused by scratching and the ingress of pyogenic organisms. In a suspicious case particular attention should be paid to the ends of the fingers and the finger-nails; and microscopic examination of the epithelium will often repay the searcher.

Dermatitis from plants.—Many plants, either from the presence of irritating hairs or from their secreting an irritating oil, have the power of producing dermatitis in people who handle them. The most familiar example of this is the common stinging-nettle, but the primula family, especially *Primula obconica*, is particularly prone to do this, as also are *Rhus toxicodendron*, *Rhus venenata*, *Rhus diversiloba*, and *Laportea gigas*. Certain bulbs, also, such as the scillæ produce an artificial dermatitis. *Primula obconica* is a poisonous plant which closely resembles the English primrose; its leaf contains a number of spines which readily attach themselves to the skin and set up an acute inflammation. Many people, however, seem to have an immunity from the poisonous effects. *Laportea gigas* (a tropical stinging-nettle) has a fruit like a raspberry, and the small hairs on the stems and leaves seem to have the power of setting up a dermatitis. The eruption produced by these plants, as a rule, starts on the lateral surfaces of the fingers and spreads to the back of the hand, involving the front and back of the wrist and front and back of the forearm. It closely resembles erysipelas, for which disease it is often mistaken. The eruption consists, as a rule, of an erythema covered with closely packed vesicles and a considerable amount of subcutaneous swelling. It generally lasts from a few days to two, three, or four weeks.

Porchester-terrace, W.

A CASE OF
MENINGOCOCCAL INFECTION WITHOUT INVOLVEMENT OF THE CEREBRO-SPINAL SYSTEM.

BY W. M. ELLIOTT, M.B., CH.B. GLASG., D.P.H. CAMB.,
ACTING PHYSICIAN-SUPERINTENDENT, CITY OF GLASGOW FEVER HOSPITAL, RUCHILL.

THE following account of a case coming under my care may prove of interest in view of the fact that reports of instances of meningococcal infection other than meningeal are so far scarce.

A private in the Royal Field Artillery, aged 19, was admitted to hospital on March 11th, 1915, with the history of having four days before (following a period of some days during which he had been suffering from a "cold") become ill suddenly with shivering, headache, and generalised pains in the back and limbs, and a feeling of feverishness. He took to his bed, and in the course of a day or two a rash began to come out on the body. The acute symptoms persisted and were accompanied by an elevated temperature. A provisional diagnosis of typhus fever was made and his removal to hospital was ordered. His condition on admission was as follows: Temperature 104° F., pulse 120, respirations 24. The patient appeared acutely ill and complained of pain all over the body. His expression was quite intelligent, though his eyes were somewhat heavy and suffused and there was slight conjunctival discharge, and he was able to give perfectly coherent answers to questions regarding his illness. A rash was present which consisted of three elements—erythematous blotches, petechial spots, and very shallow vesicles which contained blood. The erythematous spots were distributed over the trunk and limbs in a manner similar to measles, but they were not raised above the level of the skin. The petechial spots were confined to the arms and legs, and occurred as minute purplish spots scattered through the erythema and showed a distinct tendency to be collected into small groups. The vesicular elements were entirely confined to the legs and were few in number, though some were as large as a sixpence; they were formed by the lifting of the superficial layers of the epidermis by the effusion of a thin layer of blood; in every case they had become dry, and on breaking through the surface dried blood could be scraped out from underneath. The pulse was rapid and bounding, but of good quality and regular. The cardiac sounds and dullness were normal. The pulmonary area was everywhere resonant, and no alteration in the breath sounds was to be heard, nor were any adventitious sounds present. The tongue was lightly coated and the throat slightly reddened. Examination of the abdomen revealed no abnormality. The stools were normal, though there was a tendency to constipation. The patient's mental condition appeared quite normal. The tendon reflexes showed no abnormality and there was no post-cervical stiffness and no Kernig's sign. The urine contained a haze of albumin, but no blood or tube casts. The diagnosis of typhus fever was discarded owing to the clearness of the patient's mental condition and the fact that, though the rash simulated the typhus exanthem fairly closely, there were distinct points of difference.

The subsequent course of the case was as follows:—March 12th: Temperature 104°–101° (falling). The rash was still bright; the general pain persisted; the mental condition remained quite clear. Lumbar puncture was performed and a clear fluid obtained, which was not under undue pressure and which remained free from clot, and was found microscopically to contain only normal cells. 13th: Temperature: morning 99·2°, evening 99·6°. Rash beginning to fade on the trunk but still bright on the arms and legs. Pains less severe. 14th: Temperature: morning 98.8°, evening 98·6°. Rash faded on trunk but still present on

limbs. Pains entirely disappeared. 15th: Temperature: morning 98·6°, evening 97·4°. Rash fading on arms. 16th: Temperature: morning 98·4°, evening 98·6°. Rash faded on arms but still present on legs. 17th: Temperature: morning 97·4°, evening 98·2°. Erythematous elements of rash on legs faded, but petechial and vesicular elements still present. 18th–20th: Temperature normal. Gradual fading of remnants of rash on legs until they had quite disappeared. From this time on the patient had an uninterrupted convalescence, and was dismissed well on April 30th, 1915.

From the foregoing account it will be seen that the case presented the features of an acute febrile condition accompanied by a very definite exanthem, the acute symptoms ending by crisis on the sixth day of illness.

While searching for a possible diagnosis I remembered two incidents which helped to turn my investigations into a particular channel, one being that a short time previously a patient from the same barracks had been admitted to hospital suffering from cerebro-spinal fever in the fulminant form, and the other that in a certain case of cerebro-spinal fever I had observed a rash which was identical with the one above described, the blood-filled vesicles being particularly well marked. With these facts in view I proceeded to investigate the properties of the patient's serum, and its agglutinating powers were tested against an emulsion of the meningococcus.

Three parallel experiments were carried out with serum—(A) from a definite case of cerebro-spinal meningitis, (B) from a normal individual, and (C) from the case under investigation. Dilutions of the sera of 1–25, 1–50, and 1–100 were used, and the amount of agglutination at the end of 24 hours was noted with the following result:—

Case.	—	Dilutions.		
		1-25	1-50	1-100
A	Agglutination.	Marked.	Marked.	Marked.
B	,,	None.	None.	None.
C	,,	Marked.	Distinct.	None.

The result seemed to indicate that the patient had some specific agglutinins present in his serum, but it was thought that some further proof of a meningococcal infection was necessary because of the fact that the agglutination reaction in the case of this organism is not altogether satisfactory. Consequently a further experiment was undertaken to test for the presence of immune bodies by the deviation of the complement method.

In this experiment also three sera were tested simultaneously—(A) from a case of cerebro-spinal fever, (B) from a normal individual, and (C) from the case under investigation. The antigen used was an emulsion in sterile saline of an 18 hours' growth of meningococci on glucose-bouillon serum. Fresh guinea-pig's serum was used for complement and was found to have a minimum hæmolytic dose of 0·004 c.c. for 0·5 c.c. sensitised ox-blood corpuscle suspension. The amounts of the constituents used in the reaction were: Antigen, 0·3 c.c.; patient's serum, 0·025 c.c., 1, 2, 4, 6, 8, &c., M.H.D.'s of complement in successive tubes. A half c.c. of sensitised ox-corpuscle suspension was used as indicator of the presence of free complement. The following results were obtained:—

Serum.	Number of M.H.D.'s of complement absorbed in presence of meningococci emulsion (0·3 c.c.).
A (0·025 c.c.)	Ten
B ,,	One.
C ,,	Fourteen.

These results seemed to prove conclusively that the patient had specific antibodies to the meningococcus in his serum. Attempts were made to obtain the organism in culture from the naso-pharynx, but they were unfortunately unsuccessful, possibly owing to the fact that they were made too late in the course of the illness.

In reviewing the facts obtainable regarding this case there seems to be little doubt that the patient had suffered from an infection by the meningococcus without involvement of the cerebro-spinal system and that the case falls into the so-called septicæmic class of cerebro-spinal fever, as described by Mr. A. Lundie, Mr. D. J. Thomas, and Mr. S. Fleming in one of their articles on the disease.* A special point of interest is the fact of the occurrence of a rash the character of which called attention to the nature of the infection, for, had the rash been absent, the symptoms alone would have justified a diagnosis of a simple chill or influenzal attack and the true nature of the infection would have been missed.

A case of this kind must be regarded as a distinct menace to contacts, as there is no guarantee that in a secondary case the infection might not lodge in the cerebro-spinal system and give rise to the much graver type of the disease. A more general use, wherever possible, of serological methods of diagnosis in suspicious cases would enable such sources of danger to be appropriately dealt with.

ON A RAPID METHOD FOR
THE CULTURAL DIFFERENTIATION OF THE TYPHOID AND PARATYPHOID BACILLI A AND B.

REPORT TO THE MEDICAL RESEARCH COMMITTEE.

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AND
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(*From the Biochemical Laboratory, Cambridge.*)

IN the spring of 1915 our attention was attracted to certain bacteriological problems by a conversation with a pathologist recently returned from a base hospital in France. We were impressed by him with the desirability of shortening the time at present required for the differentiation by biological reactions of the organisms responsible for the typhoid and paratyphoid fevers, and of investigating the bio-chemistry of these bacteria. This reports deals with the method we have finally adopted for the differentiation of *B. typhosus*, *B. paratyphosus A*, and *B. paratyphosus B* (subsequently called T, A. and B. respectively), as well as certain considerations suggested by our experiments.

We first attempted to differentiate the organisms by a determination of the final hydrogen-ion concentration reached by them in media containing carbohydrates. We thought it possible that this final concentration might be characteristic of a given organism rapidly attained and independent of the nature of the medium, and also that the method might be applicable for the recognition of closely allied members of other groups. We therefore grew the various strains we were studying in media containing glucose, and determined the hydrogen-ion concentration by the electrical method, after various periods of incubation. The tubes were steamed for 20 minutes before the readings were taken.

The potentials were measured by duplicate sets of apparatus, the chain employed being:—

$$PtH_2 \mid \text{fluid} \mid \text{saturated KCl} \mid HgClHg$$

The type of calomel cell and electrode was similar to that described by Barendrecht.[1] Potentiometers and high-resistance mirror galvanometers by Tinsley[2] were used and found to be extremely satisfactory. The readings were taken at a temperature of 20° C., which was maintained by an air thermostat heated and controlled electrically. A special method was devised for checking the readings as well as the potentiometer box itself. This method necessitates the use of twin electrodes as well as a multiple key which will be described in a later communication.

At first our results led us to believe that the problem was a relatively simple one, for on a particular medium we got constant results and a sufficient difference of potential to enable us to distinguish the organisms in question. This difference was 10 to 20 millivolts, which is beyond the limits of the experimental error of the electrical method. However, we soon found that the final hydrogen-ion concentration is in some way dependent on the non-carbohydrate content of the medium. This is not in agreement with the conclusion of

* Brit. Med. Jour., 1915. i., 836.

[1] Biochem. Jour., ix., No. 1, p. 66, March, 1915.

[2] Eldon Park Works, South Norwood, London, S.E.

Michaelis and Marcora,[3] who considered that the final hydrogen-ion concentration reached by *B. coli* when grown on "bouillon," containing a sufficient amount of lactose, was a physiological constant for that organism, independent of the initial reaction and of the lactose content.

Whilst our work was in progress papers were published by Clark[4] on the final hydrogen-ion concentration reached by *B. coli*, and by Clark and Lubs[5] on the differentiation of various types of *B. coli* by the use of indicators. They state that the final hydrogen-ion concentration varies slightly according to the buffer content of the medium, but they claim that their results are, on the whole, in agreement with those of the German authors. Our estimations of the final reaction reached by *B. coli* upon glucose and lactose showed a considerably higher degree of acidity than that recorded by any of these authors. We were at a loss to account for this difference until we found that the final concentration reached is dependent in some way on the quality and quantity of the nitrogenous constituents of the medium. With certain media we have obtained a final P_H as high as those published. This effect of the nitrogenous constituents has very much delayed our progress. It is so remarkably subtle that using one sample of Witte's peptone constant results could be obtained, but with a different sample the order of the final acidities might almost be inverted, changing, for instance, from B > A > T to B = T > A.

It is this lack of uniformity which, as stated elsewhere, led us to attack the problem of the preparation of a standard nutrient medium. In this we trust we have succeeded, and we have already published a description of our "tryptic broth" in this journal.[6] This broth is prepared by digesting a solution of commercial casein with trypsin. The product is treated in a given way and brought to a definite hydrogen-ion concentration by a simple colorimetric process. Using this as a fluid medium, it was soon found that the hydrogen-ion concentration reached by a given organism is not quite so stable as on the ordinary nutrient media. A certain grade of acidity is rapidly reached and then the reaction tends to becomes less acid. This phenomenon was carefully investigated with different concentrations of glucose and of the casein digest. It is more marked in these casein digests than in any other media we have tried. This may be due to the fact that the reactions causing a decrease of acidity take place more readily with free amino-acids than with peptones or polypeptides. The chemical mechanisms involved in the alkali production are being investigated and will form the subject of a further report.

With low concentrations of glucose (0·1 to 0·2 per cent.) there is an actual reversal from an acid to an alkaline reaction as shown by indicators. One important factor in this process is the adequate supply of oxygen, in the absence of which the alkali production is inhibited. In test-tube experiments the rapidity and extent of the change are therefore dependent on the ratio of the diameter of the tube to the volume of medium employed.

During our work on these changes of reaction, using varying concentrations of fermentable sugars and of the casein digest, we have established the following facts:—

(1) *An acid reaction is produced rather sooner by B.* (and B. coli) *than by T. and A.* An experiment in which litmus was the indicator is given in a previous paper.[7] With phenol-sulphone-phthalein as the indicator the change is seen earlier and is much more sharply defined.

(2) *When excessive production of acid is prevented by using low concentrations of glucose, the reversal to an alkaline reaction is most rapid with B. and slowest with A.* The fact that A. does finally render this medium alkaline is worthy of note, since on litmus milk A. gives a slight permanent acidity.

(3) *When incubated for 24 hours in "tryptic broth" containing 0·2 per cent. glucose, B. produces an alkaline reaction to phenol-sulphone-phthalein, whilst T. and A. give acid reactions.* This difference is so marked and so constant that we have adopted it as the basis of our method for the cultural diagnosis of B. from T. and A. It is conditional on the size of tube and volume of fluid specified in the description of the method given below.[8]

(4) *When incubated in "tryptic broth" containing 0·1 per cent. glucose*[9] *for 24 hours, B. and T. cause an alkaline reaction to phenol-sulphone-phthalein, whilst A. gives an acid reaction.* The difference in reaction between T. and A. is, unfortunately, not quite sufficient to cause a change of colour to phenol-sulphone-phthalein or any other indicator, definite enough to differentiate all the strains. Certain organisms give colours which tend to be intermediate. This renders the method an unsafe one to recommend for routine work. We have abandoned it with reluctance after many trials with varying concentrations of glucose and digested casein and with varying incubation periods. None the less the difference in reaction between A. and T. on "tryptic broth" containing 0·1 per cent. glucose, incubated for 24 hours and steamed for 20 minutes is, when measured electrically, usually about 30 millivolts, and in our experience never less than 20 millivolts. Hence, we are of the opinion that the final hydrogen-ion concentration reached under these conditions is a biological characteristic of the above organisms.

For the separation of T. from A. in routine work we rely upon two well-known facts—the formation of gas in glucose and the rapid fermentation of dulcite by A. and not by T. The usual difficulty of obtaining gas with A. seems to be overcome by the use of diluted "tryptic broth" (T/6),[9] as we have shown in an earlier paper.[10] We find that dulcite is rapidly fermented by A. when grown in T/6, with phenol-sulphone-phthalein as indicator. Under the conditions specified below marked acidity is produced by A. in less than 24 hours, whereas on ordinary media with litmus as indicator definite acidity is not usually reached under 48 hours. The first effect of T. is to cause an increased alkalinity owing to the action of the organism on the nitrogenous substances present. This probably accounts for the length of time required to obtain an acid reaction.

We would like here to emphasise the value of phenol-sulphone-phthalein as an indicator for bacteriological purposes. The colour change takes place in the range of reactions corresponding to the optimum for most organisms. It is not readily decolourised, nor does it appear to inhibit growth. One of its greatest advantages over litmus as an indicator for acid production is the very small change in the reaction necessary to cause a marked change in colour. The indicator is lemon-yellow in acid solution and red or magenta in alkaline solution. Its range is P_H = 6·8 to 8·4. We generally use 4 c.c. per cent. of a 0·04 per cent. solution.[11]

Method of Differentiation.

We do not propose here to provide a complete scheme for the identification of T., A., and B., but merely a rapid cultural method of differentiating these from one another.

Two solutions are employed, a glucose solution ("G.") and a dulcite solution ("D."). The former is used for differentiating B. from T. and A., since at the end of 24 hours B. is alkaline while the others are acid. The solution "D." differentiates A. from T., since at the end of 24 hours A. is acid and T. alkaline. The solutions required are as follows:—

Glucose Solution "G."

"Tryptic broth"	1000 c.c.
Phenol-sulphone-phthalein (0·04 per cent.) ...	40 ,,
Glucose...	2 gm.

Tube in 3 c.c. portions,[12] and sterilise by steaming for 20 minutes on three successive days. We employ tubes of $\frac{5}{8}$ in. diameter. This size must be adhered to in order to obtain the desired differentiation, for with a decrease of diameter the rate of alkali production is retarded, with an increase it is accelerated. This is due to the effect of the diameter of the tube on the surface area, and therefore on the supply of oxygen.

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[3] Zeit. für Immunitätsforschung, Jena, 1912, xiv., 170.
[4] J. Biol. Chem., 1915, xxii., 87.
[5] J. Infect. Dis., July, 1915, xvii., 160.
[6] THE LANCET, July 1st, 1916, p. 9.
[7] Loc. cit., p. 10.

[8] 3½ c.c. in tubes 5/8 inch diameter.

[9] That dilution of the casein digest (stock broth) which we call "tryptic broth" and which is made by adding two volumes of 0·5 per cent. saline to one volume of stock broth is conveniently designated by the fraction T/3. If this be diluted with its own volume of saline the dilution becomes T/6, the concentration indicated above.

[10] THE LANCET, July 1st 1916, p. 9.

[11] To prepare this dissolve 0·4 gm. of the indicator (which may be obtained from Martindale, 10, New Cavendish-street, London, W.) in 20 c.c. of decinormal NaOH in a litre measuring flask. Shake gently till dissolved, add 800 c.c. of distilled water, 20 c.c. decinormal HCl, and make up to a litre with distilled water.

[12] We employ an automatic apparatus which rapidly delivers any desired amount, recently described by one of us in THE LANCET, Oct. 21st, 1916, p. 716.

Dulcite Solution "D."

T/6	1000 c.c.
Phenol-sulphone-phthalein (0·04 per cent.)	40 c.c.
Dulcite	2 gm.

The diluted "tryptic broth" (T/6) must be accurately adjusted to $P_H = 7{\cdot}35$ by the method described in our previous communication,[13] before the addition of the dulcite and phenol-sulphone-phthalein. Tube in 2 c.c. portions in tubes of $\frac{5}{8}$ in. diameter,[14] and sterilise as before. A glass bead is usually added before sterilising to distinguish these tubes from "G." We also have ready tubes containing 0 5 per cent. sucrose and 0·5 per cent. lactose; also fermentation tubes containing 1 per cent. glucose. These sugars are dissolved in T/6, and phenol-sulphone-phthalein is added in the proportion mentioned above. Any other carbohydrate solutions required in the particular routine employed are advantageously made up in the same way.

After plates have been grown from fæces or other material in the usual manner, suspicious colonies are emulsified into a tube of glucose broth. This tube is then incubated for two hours. Two loops of this are then sown into a tube of "G." and "D." as well as the other sugars employed. These tubes are then incubated for exactly 24 hours at 37° C. The tubes are now inspected, and can be examined for motility if this has not already been done. Should the presence of T., A., or B. be indicated by the reactions of the lactose-sucrose and glucose fermentation tubes, the final differentiation can be decided by the reactions in "G." and "D." After 24 hours they are as follows:—

Organism.	Solution "G."	Solution "D."	Glucose fermentation tube.
B. typhosus	Ye low	Red or pink	Acid
B. paratyphosus A	Yellow	Yellow	Acid and gas
B. paratyphosus B	Red or pink	(Variable)	Acid and gas

The change of reaction undergone by B. in solution "D." seems to be variable, but this is of no importance, since its presence can be ascertained from solution "G." In some cases acidity is reached in the space of three or at most four hours, whereas in others so great is the capacity for alkali production during the initial stages that the dulcite never affords sufficient acid to change the reaction. On the other hand, the behaviour of A. after the first 24 hours is quite distinctive, and we obtain confirmatory evidence of its presence by allowing the tubes to remain an additional 48 hours in the incubator. Under these circumstances we find that A. remains a bright yellow until the middle of the third day. By this time T. and B., as well as the large majority of the non-pathogenic fæcal organisms, show distinct alkalinity.

We have not succeeded in finding a cultural distinction between *B. paratyphosus B* and *B. enteritidis* Gaertner. In this method, as in all others, the final test is agglutination against specific sera.

The reactions recorded in solutions "G." and "D." have been tested repeatedly with 36 strains of T., A., and B. (12 of each) collected from various pathological laboratories. All these strains have been found to agglutinate with their specific sera at dilutions of 1 in 500 or higher.[15]

Incidentally we might mention that a comparison was made of "tryptic broth" with veal broth for the preparation of the formolised antigens required for agglutination tests. The organisms were daily subcultivated for a fortnight. Under these conditions we find that "tryptic broth" yields uniformly better results than veal broth. If, however, a small amount of glucose (0·1 per cent.) be added to the "tryptic broth" the results are inferior to those with the veal broth. This suggests that the value of "tryptic broth" for the preparation of such antigens is due to its freedom from sugar.

In conclusion, we trust that the method of differentiation we have described, based on the hydrogen-ion concentration reached under definite conditions, may prove of value in rapidly demonstrating an additional characteristic of the typhoid and paratyphoid organisms; and, further, that the use of "tryptic broth" in the preparation of various media, especially those for the detection of acid and gas production, may help to simplify and accelerate the work of some bacteriologist.

[13] THE LANCET, July 1st, 1916, p. 9.

[14] Should the tubes be stored for any length of time care must be taken to prevent evaporation, which causes considerable changes in the relative concentrations, &c., owing to the small volume of fluid employed.

[15] The Oxford "standard" sera were used for these tests. For the supply of these sera we are greatly indebted to the Medical Research Committee.

DIFFUSE MYXOCHONDROMA OF A LONG BONE.

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CHONDROMA is a common type ot new growth occurring in early life. Peripheral and central varieties are recognised, the latter being the common one and situated mostly in the phalanges. The peripheral variety selects the longer bones, and of these the femur is one of the most frequently affected. There they form localised tumours, which probably spring from cartilage, so that with advancing age and the disappearance of cartilage from the long bones (the articular cartilage excepted), their occurrence late in life is unlikely.

The accompanying illustrations are of a specimen obtained from a female aged 65 years, who for seven and a half years complained of slight discomfort in the upper part of the right thigh without swelling, so far as she was aware, till shortly before her admission to hospital. At that time there was a visible fullness of the upper third of the right thigh, which felt as if due to a hard nodular enlargement of the femur, in the neighbourhood of the great trochanter. Passive movements at the hip-joint were not impaired, the temperature was normal, the patient's past history was negative, there was no evident metastasis, and the general health was unaffected. Her single complaint was the increasing discomfort, amounting at times to actual pain, in the upper part of the right thigh.

FIG. 1.

Diffuse myxochondroma of femur. The bone is seen in section after longitudinal bisection.

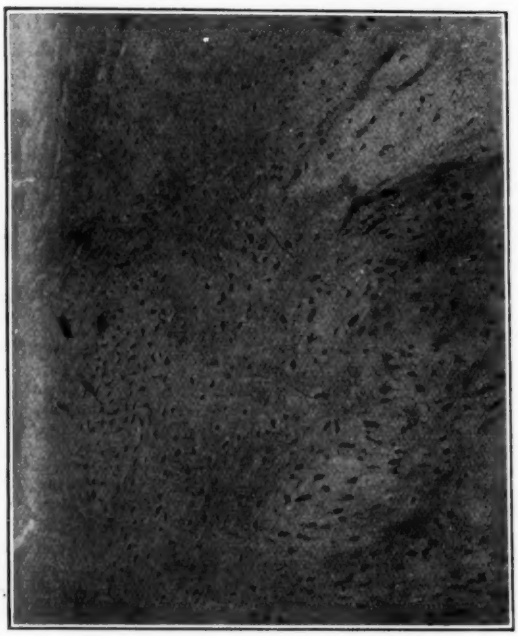
On the X ray plate general enlargement of the upper third of the femur was evident, consisting of tissue less dense than the imperfect shell or case of compact bone. It appeared to be a central sarcoma, causing expansion with thinning of the compact bone, for which the limb was disarticulated at the hip. In commencing the operation an incision was first made into the tumour, when a hæmorrhagic friable tissue escaped, supporting the presumption that the condition being dealt with was as diagnosed.

Macroscopic appearance.—The extent of involvement of the femur was greater than appeared from the X ray plate. Superficially, the growth involved the circumference of the

femur, from the level of the small trochanter to the junction of the upper and middle thirds. Due to infiltration by the tumour, the muscles were difficult to separate. At the upper limit there was a ring of nodules, varying in size from a chestnut to a crab-apple, firm in consistence, with softer areas, and composed of glistening cartilage-like tissue. The softer areas contained clear mucoid-like material. The surface of the remainder of the femur, from the neck to within two inches of the condyles, was roughened with the same cartilage-like tissue. The cleaned femur was frozen and bisected in the coronal plane. As appears in Fig. 1, each half resembles a dagger, a line about the level of the small trochanter forming the transverse piece. The medullary cavity, from the head to within two inches of the lower extremity, is occupied with the same cartilage-like tissue. Hæmorrhagic areas and areas of myxoma-like softening are scattered throughout. The aforementioned nodules or bosses have a limiting wall of fibrous tissue, and the compact bone is generally thinned, but in the neighbourhood of the bosses is mostly absent.

Histology.—The tumour is a myxochondroma. In Fig. 2, which is a section of one of the nodules, the majority of the cells are small, fusiform, and stellate, with fine processes, lying in a homogeneous matrix which stains bluish. Towards the periphery (left of the illustration) there are typical capsulated hyaline cartilage cells. The central parts consist of myxomatous tissue, with firmer areas which are cartilaginous. There is a limiting capsule of fibrous tissue, from which remnants of trabeculæ extend inwards, and underneath the capsule are here and there a few calcareous granules and small areas of commencing calcification.

FIG. 2.



Diffuse myxochondroma of femur. Section of one of the nodules.

Commentary.—The new growth, we may fairly presume, was primarily a chondroma which had undergone myxomatous degeneration. The condition is an interesting rarity for two reasons—first, because of its diffuseness as a chondroma; and, secondly, because of its occurrence in a patient so advanced in years. For these reasons the condition was clinically unsuspected, and I have been unable to find an analogy in the literature of affections of long bones.

Summary.—Chondroma undergoing myxomatous degeneration occurring in a patient aged 65 years. For a chondroma the tumour was unusually diffuse. It simulated and was diagnosed central sarcoma of bone. The extent of the growth was considerably more than appeared on the X ray plate.

I am indebted to Professor J. H Teacher, who kindly examined the sections and concurred in the above description.

OCULAR VERTIGO.

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THE equilibrium of the body depends upon the coördinated action of various groups of muscles. Afferent impulses from certain peripheral organs convey the necessary information to the cerebellum, and the communications between the cerebellum and the cerebral motor-cortex secure the contraction of the required muscles. Vertigo is a consequence of insecure equilibrium, and may therefore result from either a central or a peripheral defect. The eyes are not the least important of the peripheral organs by means of which we gain information as to our position in space. They may give us fallacious information, either because they have to deal with abnormal surroundings or because they are themselves in some way abnormal. Ocular vertigo may result in either case, and is all the more probable when the two conditions are combined. The giddiness caused by looking down from a height or by staring at rapidly moving objects is an instance of the first; that caused by the paralysis of an external ocular muscle or a partial opacity of one of the various media is an example of the second.

In the instances quoted vertigo is almost entirely ocular, but in the great majority of cases it is so more indirectly. The perfectly emmetropic eye may exist in nature, but in all probability a certain amount of astigmatism is both physiological and purposeful, and in the normally developed eye there would appear to be some relationship between the astigmatism and the antero-posterior length. In any case, whatever its length and curvature, every healthy eye has its own normal standard of visual acuity, maintained by a muscular correction of at least a part of the refractive error, while upon occasion an even higher standard may be reached by straining. The visual ideas we have of our surroundings are those as pictured to us by this normal standard of visual acuity, 6/12, 6/6, 6/4, or whatever it may be; with these ideas, or only gradual modifications of them, we have grown up, and to them we are used. As long as this normal standard is maintained or only gradually modified, our visual knowledge of our ordinary surroundings is accurate and stable; but when sudden variations from this standard arise the information given us by our eyes is fallacious and vertigo may result.

As years advance some impairment of vision is inevitable in every eye that is not perfectly emmetropic; not only does the muscular mechanism become less energetic, but the crystalline lens becomes less and less able to respond to it. Such a process in a healthy person is a very gradual one; the muscular effort, though feebler, is steadily maintained; the visual apparatus as a whole is stable, and there is no tendency to giddiness. On the other hand, vertigo is a common phenomenon on the first adoption of a correcting lens. If the lens is accurate a perfect image can only be obtained when the muscular mechanism is absolutely quiescent; such quiescence is quite unnatural to it, and it persists in trying to do what it has been accustomed to do; any effort it makes inevitably causes some blurring of the image; the visual apparatus as a whole is unstable, and giddiness may follow. When an inaccurate lens is adopted vertigo is still more probable, for a stable condition is only possible when the eye has learnt to deal with the new artificial error. Again, when a correcting lens is discarded a call is at once made upon the muscular mechanism to do the work the lens has been doing; it usually cannot, at any rate at first, adequately respond; an unstable condition again arises with similar possibilities.

The presence of an uncorrected error of refraction is always a potential cause of giddiness, and it may be asked why one person should have trouble and another not, and, still more, why a patient who has had years of comfort should have attacks of vertigo. In point of fact, similar questions arise about many other phenomena, and it is quite certain that, though some kinds of error are undoubtedly more difficult to deal with than others, it is neither the amount nor the nature of the error which is the important point, but rather the ability of the muscular mechanism so to compensate it that the visual apparatus as a whole is stable. Heredity certainly plays a great part; modern education, especially in girls between 14 and 21, may be disastrous; and occupation is always of supreme importance: the

gardener is much less likely to have trouble with his refractive error than the clerk, the surgeon than the bacteriologist. Any exhausting central or peripheral stimulus, a sunstroke, a head injury or other serious accident, an operation, childbirth, a debilitating illness, "shell shock," may lead to an inability to cope with ocular defects. Similarly, there may be a breach of compensation as a result of poisons, endogenous or exogenous, of alterations in the quantity, quality, or pressure of the blood, of worry or other psychical causes. In almost every case there are at least two such factors at work.

Once the muscular mechanism has become unstable, giddiness may occur when any special strain is put upon it by, e.g., (1) a spell of reading or close work; (2) change of posture—stooping, getting in and out of bed; (3) locomotion—train, tram, tube, motor, and even walking in crowded streets or going up and down stairs or lifts; (4) a visit to a cinematograph, theatre, or picture gallery; (5) glare, especially on a sunny summer day at a fashionable seaside resort; (6) tennis and other games that involve keeping the eye constantly focussed upon a ball travelling backwards and forwards, in fact by fatigue of any kind.

It is obvious that, when giddiness arises in connexion with an unstable condition of the visual apparatus from some such causes as the above, it is not primarily ocular, and that the same causes would be conducive to other forms of vertigo. The importance of the ocular element is that it is an almost constant factor, and that the eye is the only part of the nervous system that admits of direct mechanical assistance, which should be given to it in the form of an accurate correcting lens when the condition does not readily yield to other measures. The ocular element may in this way be as far as possible eliminated, and though the amount of wasted energy saved by the glass may or may not be great in comparison to that required by the body as a whole, however little it is, it may be enough to make the receipts balance the expenditure and allow the *vis medicatrix naturæ* a freer hand. Accurately to fit the rigid to the less rigid is not an easy task, and a lens that only substitutes one error for another is useless. When there is half a diopter of simple hypermetropic astigmatism and + 0·25 S. + 0·25 C. is ordered, the result is to create an artificial myopic astigmatism of a quarter of a diopter; when the real correction is −0·25 C., and + 0·25 C. is prescribed with the axis at right angles, a pure myopia of a quarter of a diopter is produced.

A latent muscle-balance defect, especially a hyperphoria, is a not infrequent source of giddiness in similar conditions to those mentioned above.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF

ANEURYSM AT THE TERMINATION OF THE EXTERNAL CAROTID ARTERY,

AND ANEURYSMAL VARIX BETWEEN THE BIFURCATION OF THE COMMON CAROTID ARTERY AND INTERNAL JUGULAR VEIN.

BY R. F. BOLT, M.R.C.S., L.R.C.P. LOND.,
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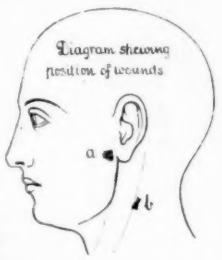
THE following case of traumatic aneurysm presents features of more than ordinary interest.

The patient, an officer aged 25, was wounded on Jan. 14th, 1916, by fragments of a rifle grenade, and was admitted to a general hospital on the 16th. There were two small wounds, one in the left cheek (*a* in figure) immediately in front of the lobule of the ear, the other (*b* in figure) opposite the posterior border of the left sterno-mastoid muscle, on the level of the thyroid cartilage, as shown in the accompanying illustration.

On examination it was found that immediately beneath the facial wound was a swelling about the size of a pigeon's egg, pulsating synchronously with the heart, the pulsation being expansile in character. A faint systolic bruit could be heard on auscultation over the swelling. In the neck the tissues of the anterior triangle were infiltrated generally and there was marked ecchymosis. Opposite the thyroid cartilage was a pulsating swelling, indefinite in outline, about the size of a hen's egg. The purring thrill characteristic of an arteriovenous wound was felt. On auscultation a continuous bruit was heard becoming louder at each systole. An X ray examination was made and two small fragments were shown, one opposite the neck of the mandible and one opposite the second cervical vertebra. The patient was kept at complete rest with his head between sandbags, in the hope that he would become fit for transfer to England.



At about midnight six days after admission a severe hæmorrhage took place from the facial wound. On removal to the operating theatre it was found extremely difficult to deal with the hæmorrhage at the site of injury owing to the vessel being embedded in the parotid gland, and Major A. E. Webb-Johnson, R.A.M.C., decided to expose the vascular lesion in the neck in the hope that only the external carotid artery was involved. The common carotid artery was exposed by an incision along the anterior border of the sterno-mastoid muscle, and a temporary ligature was placed round the vessel, which was then followed up in its course in the neck. When the bifurcation of the common carotid artery was reached, a wound was found on its anterior surface, from which a furious hæmorrhage took place in spite of the ligature on the main trunk. There was no venous hæmorrhage—in fact, the internal jugular vein appeared to be thrombosed. The external carotid artery was then controlled by a ligature, but the hæmorrhage continued from the bifurcation, an occurrence which seemed to be of good augury for the cerebral circulation. Ultimately the common, external and internal carotid arteries were secured by ligature. Intravenous infusion of saline was necessary in the theatre on account of the loss of blood.

The patient was allowed up three weeks later, having made an uneventful recovery. He was granted six months' leave by a Medical Board in England, and rejoined his regiment this autumn.

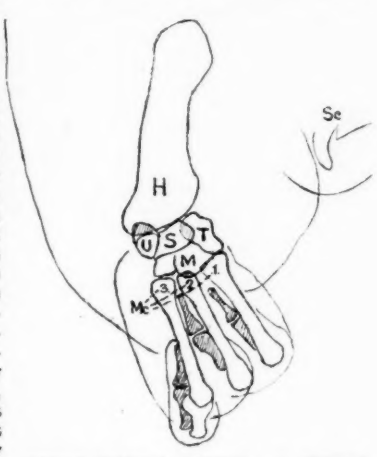
I am indebted to Lieutenant-Colonel T. H. Goodwin, R.A.M.C., and to Major Webb-Johnson for permission to publish this case.

A RARE CONGENITAL MALFORMATION.

BY W. FLETCHER STIELL, L.R.C.P. LOND., M.R.C.S.,
SENIOR HOUSE SURGEON, COUNTY HOSPITAL, LINCOLN.

I RECORD this case chiefly on account of its extreme rarity and also because of its singular interest from a developmental standpoint.

The patient was a single woman, aged 62, who sought advice for a pain localised apparently in the region of the left shoulder-joint. She was one of a family of ten, but her four sisters and five brothers suffer from no congenital deformities whatever. The patient herself ascribed her complaint to be due to the fact that her mother was scared by a tortoise early in pregnancy, and certainly at first sight the patient's upper limbs are remarkably amphibian in appearance. Notwithstanding a very serious deformity, at the present time the patient is earning a very comfortable livelihood as a skilled dressmaker. As the condition is bilateral, it is only necessary to describe one side. The total length of the upper extremity from the tip of the coracoid process to the tip of the longest digit is 7 inches.



Reduced tracing of skiagram. Sc, scapula; H, humerus; U, unciform; S, scaphoid; T, trapezoid; M, os magnum; Mc. 1, 2 and 3. metacarpals.

Muscular development is excellent. The elbow-joint itself is entirely absent, but this is compensated by an abnormally efficient range of movement at the shoulder-joint, while the mobility at both the wrist and interscapulo-thoracic joints is quite pathological. From the skiagram, of which a reduced tracing is given, it will be seen that both the radius and the ulna are entirely absent and that the carpus is represented solely by the unciform, os magnum, trapezoid, and one quite abnormal bone, probably a glorified scaphoid. The metacarpal bones of the thumb and index-finger are absent, as are also the corresponding digits to these bones. The three existing digits are held in the semi-flexed position chiefly by contraction of the flexor tendons. There is no syndactylism. The humerus is represented by a short stout bone of about four inches in length which articulates with a very abnormal scapula at its upper end and directly with the freak carpus at its lower. Notwithstanding the total absence of both the radius and ulna, there is a normal range of pronation and supination, provided apparently by an exaggerated rotatory movement of the head of the humerus in the glenoid fossa. With the exception of the upper extremities the remainder of the skeleton is normal. There is no trace of any mental impairment.

Lincoln.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF PATHOLOGY.

Exhibition of Specimens.—Results of Feeding Mice with Mouse Cancer.

A MEETING of this section was held on Dec. 5th, Dr. J. A. MURRAY being in the chair.

Dr. J. B. CHRISTOPHERSON exhibited a Large Salivary Calculus from Khartoum. The stone weighed 24 gm. and measured 4·3 cm. long, 3 cm. broad, and 8 cm. in circumference. It had been removed from a Greek aged 42, who had noticed a swelling in the submaxillary region for 18 years. A probe passed along Wharton's duct was arrested by the stone 1½ in. from the orifice. It had been removed through the mouth. Apparently the submaxillary gland had not been affected, for it subsequently regained its normal size. On removal the calculus was olive-green in colour, granular, and deeply grooved by the ramus of the jaw.

Professor S. G. SHATTOCK exhibited under the title "Pseudotuberculoma Silicoticum" a lesion about the size of a haricot, which was excised by Mr. C. R. Nitch from the substance of the lower lip, the history being that the patient, a healthy athletic man, had been some time before thrown on to the road from a bicycle at full speed, when he received injuries to the face and to the inside of the lower lip. As an alternative to the diagnosis of a neoplasm, Mr. Nitch suspected that the lump might possibly be an induration connected with the inclusion of some foreign material. Microscopic examination showed that the lesion consisted of a congeries or mosaic of giant-celled systems, and huge giant cells, hardly to be distinguished from those of tuberculosis, although no caseation was present. Von Pirquet's test, carried out about three weeks after the operation, proved negative, and no tubercle bacilli or other bacteria were discoverable in microscopic sections. In practically all the giant cells, however, and elsewhere, there were particles of silica, which stood brilliantly out when the sections were polarised. That the material consisted of silica was proved by its insolubility in boiling nitric acid. In regard to the intestinal lesions set up by the administration of pounded glass (a frequent practice in India), Professor Shattock remarked that no observations were extant, with the exception of one or two rapidly fatal cases in which particles of glass had been found in the bowel. It was unlikely, however, that a tuberculoid lesion would result from such a cause, since the infective inflammation arising from abrasions so produced would be followed by the extrusion of the foreign material. Through the kindness of Sir Arbuthnot Lane, Professor Shattock had recently had the opportunity of examining a piece of intestine excised in a presumed case of glass-poisoning where vomiting and pain came on shortly after a meal at which, it was confessed, powdered glass had been given in a meringue. The abdominal pain became chronic and was later followed by stricture. The portion of intestine excised, about 8 inches in length, from the middle or upper ileum, presented the condition of chronic enteritis, the mucosa being tumid, in places ulcerated; and the lumen at the distal and proximal ends constricted; the muscularis was notably hypertrophied. Microscopic sections carried through the ulcer, and elsewhere, disclosed no particles of glass. In this case the characters of the lesion and the difficulty of explaining its location (for both tuberculosis and syphilis were excluded) pointed to the probability that the cause alleged was the true one.

Professor SHATTOCK and Mr. L. S. DUDGEON recounted some experiments of which the object was to ascertain whether cancer cells possessed biological properties which would incite normal cells to participate in their purposeless or anarchical growth. For this end, in one set of experiments a cell-free extract of mouse cancer (No. 63, Imperial Cancer Research) was prepared by shaking the tumour pulp in Ringer's fluid to which glass had been added, so as to destroy the cells. The cell-free extract was then used as a medium in which to soak the normal tissues, which were afterwards grafted subcutaneously. The normal tissues used were (1) mouse testicle, and (2) mouse embryo, so as to include all the tissues with their endocrinal interactivities. In neither case did any neoplasm arise, although in the second a slight growth occurred from the fragments of fœtal cartilage—a result which takes place independently, however, of any such second factor. As a better extension of the second experiment the tumour itself was minced together with mouse embryo. Fœtal tissue of every kind was thus implanted amidst the growing cells of the tumour. No mixed neoplasm arose, although the tumour with which the experiment was commenced was afterwards subcultured 15 times, and the subcultures rejuvenated with mouse embryo on three occasions. The only tissue which survived was the fœtal cartilage, the fragments of which underwent a slight amount of growth; but in no instance did it present any indication of a sarcomatous transformation.

Professor SHATTOCK and Mr. DUDGEON also made a communication on certain results of feeding mice with mouse cancer. The tumour used was that known as No. 63 at the Imperial Cancer Research. The feeding was commenced in May, 1914. For the supply of tumours, mice which had been subcutaneously inoculated were from time to time killed, the tumours being afterwards removed and pinned to a slip of wood; the animals were fed in addition with oats, carrot, boiled potatoes, &c. They were four in number. 1. March, 1915: One of the four, a female, died. It had received 42 tumours, the experiment having extended over a period of ten months. An extensive growth filled the upper part of the mediastinum; in the mesentery there were some enlarged lymphatic glands. Histologically the growth was a round-celled sarcoma; it contained no giant cells. On the lung there were a few minute nodules which exhibited the same structure as did also the mesenteric gland. 2. April 1915: A second mouse was killed as it had developed a prominent tumour in the left labium. It had received 42 tumours. The growth was found to surround the lower part of the vagina, but without protruding from the canal; it proved to be microscopically an invasive endothelioma. 3. A third mouse was killed in July, 1915, since the abdomen was large, the enlargement having exceeded the period of pregnancy. The enlargement, however, proved to be due solely to the growth of two masses of fat about the uteri, probably following the close of the reproductive function. 4. The last of the mice (male) died in August, 1916. It had received 72 tumours. On one lung there was a small solid formation, which was microscopically of compact, uniform structure, without leucocytes and consisting of epithelial cells: the surrounding tissue was normal. It was wholly unlike a broncho-pneumonic nodule, and the alternate view was that it was a primary carcinoma. The authors possessed a section of a tumour, the size of a pea, which was found unexpectedly in the human lung at a post-mortem examination, and which was structurally identical with the foregoing, and, like it, might be regarded as a primary carcinoma arising from the epithelium of the pulmonary alveoli. In commenting upon these results the authors remarked that as none of the new growths were identical in structure with that used for feeding the animals, they could not be viewed as due to cell implantation. This was parallel

with the fact that among the tenants of "cancer-houses" the disease affected different organs, and often those deeply seated, where direct implantation was out of the question. In cancerous families it was equally true that the disease might affect different organs and be of different histological structure in different members, and, moreover, that the appearance of sarcoma might be intercalated amongst carcinomata. There was, however, a second hypothesis of transference as a post-natal phenomenon, which the various facts brought together suggested—viz., that the cell might be the vehicle of an ultra-microscopic virus symbiotic with it; and that if transplantation of the cell failed the virus might be freed, and after its absorption and distribution might infect some structure of a second individual, provided there were any such structure prepared for its symbiosis. Whether the virus in hereditary transmission was itself transferred, or whether the transmission were limited to the aptitude of certain cells for post-natal infection, was a matter that need not be discussed. It was clear, however, that the parasitic theory, as rehabilitated in the form of an ultra-microscopic symbiote, was not disposed of by the facts established in regard to heredity. And the same might be said of the results of the experimental prophylactic immunisation against grafted mouse cancer by the antecedent subcutaneous injection of mouse blood, or of mouse embryo, or mouse skin; they so modify the fate of the grafted cells that the virus is rendered harmless, since there are no other cells prepared to symbiose with it. If the results of the mouse-feeding experiments recorded are to be interpreted on a parasitic hypothesis it would be, then, that the carcinogenic virus was freed on the destruction of the ingested cells and transferred after absorption to the body of the host, wherein it incited the formation of a malignant neoplasm in some spot where the cells were prepared for its symbiosis.

SECTION OF ELECTRO-THERAPEUTICS.

Treatment of War Injuries by Electrical Methods.

A MEETING of this section was held on Nov. 17th, Dr. G. HARRISON ORTON, the President, being in the chair.

Major W. J. TURRELL, R.A.M.C. (of the Oxford Military Hospital), introduced a discussion on the Treatment of War Injuries by Electrical Methods, which is published in full in this issue of THE LANCET.

Dr. T. GRAINGER STEWART spoke of his experience of electro-therapeutic methods, mostly in connexion with neurology. He was very willing to accord to electro-therapeutics the great amount of success which he thought everyone admitted was due to it in the treatment of nerve injuries; but he also agreed as to the necessity of correlating the clinical side with the method used. He spoke highly of the value of static treatment, and said the late Sir William Gowers held an equally good opinion of it, especially for certain conditions of muscular atrophy, and where stiffness of joints was due to reflex or functional contracture of muscles.

Dr. F. HERNAMAN-JOHNSON uttered a warning against over-stimulation of muscles, resulting in their fatigue. This was, in many cases, due to an imperfectly trained man seeking to expedite his results; its effect was to retard recovery. In such cases it was necessary to apply a relaxation splint and to abstain from applying stimulation for several days. An electro-therapeutic department must be self-contained. If a stiff joint was being treated in the department it was not fair for the surgeon to break it down, without reference to the treatment being carried out. For shell-shock, cerebral galvanisation, after the method of Le Duc, was very serviceable, especially for the attendant sleeplessness; but the polarity was an important factor. Hypnosis had also been found of considerable benefit; and the application of X rays had been found very efficacious for allaying pain.

Dr. F. HOWARD HUMPHRIS confined his contribution to a consideration of the benefits to be derived from the static form of electricity, though that did not mean a lack of appreciation of other methods. In regard to certain therapeutic uses, he knew nothing which could replace the static machine. It provoked muscular contractility, and brought about local vibratory effects without causing pain, and so relieved congestion and stasis. It was useful in most forms of trench-foot, even when gangrene had already set in.

Dr. BURKE related the results he had had in 300 cases of nerve injury. He largely employed rhythmic stimulation by the faradic current—i.e., the stroking method—though the various other forms were used in suitable cases.

Dr. E. P. CUMBERBATCH thought that in the discussions which had been held concerning the treatment of war injuries, electricity had received but scanty attention; and Major Turrell was to be congratulated on the results which he had obtained at Radcliffe Infirmary. That gentleman was fortunate not only in having a well-equipped electrical department but in being able to select a large number of his own cases for electrical treatment. He gave a summary of his results at St. Bartholomew's and the 1st London General Hospital.

Dr. DONALD BAINES, Dr. BATTEN, and Dr. ETTIE SAYER continued the debate, and Major TURRELL replied.

MEDICAL SOCIETY OF LONDON.

The Blind Soldier.—Facial Restoration.—Limping and the Re-education of Walking.—Speech Defects in Soldiers.

A MEETING of this society was held on Dec. 11th, Lieutenant-Colonel D'ARCY POWER being in the chair.

Mr. ARNOLD LAWSON described the work being done for the blind at St. Dunstan's, to which Sir Arthur Pearson was devoting his life. Whilst retaining its name, St. Dunstan's had now become a great national undertaking with accommodation for 180 men at the central institute, 200 at Regent's Park College, two large houses in Portland-place for officers and another in Paddington, and convalescent homes at Brighton and Torquay. For the purposes of after-care, the kingdom had been divided up into eight districts. At present there were 260 men in training and 128 others in hospitals or elsewhere awaiting treatment; 125 had been fully trained for an average of eight months and settled. Men were considered blind if through visual defect they were incapable of carrying on an ordinary existence and supporting themselves. A difficulty arose with regard to shell-shock cases of blindness; some had come to be treated as blind, others had been referred to convalescent homes, &c. A complete revolution in the training of the blind had been brought about by the war. Before the inmates of institutions for the blind had chiefly been affected since infancy, or were old people. The saving clause of the present situation was the buoyancy and reparative power of the youthful patients. The men were taught to accept their lot as an inconvenience, not as a disability; to retain their feeling of independence, and to lose the natural suspicion of the blind man. All were taught to read and write. It was unfortunate that Braille was so difficult for men whose fingers had been rendered insensitive by their previous occupation. Typewriting had proved to suit everyone. Each man was also taught two handicrafts, as far as possible by blind instructors, massage excepted. Physical fitness was assisted by Swedish exercises. Working hours were from 9 30–1 and 2.30–4.30; it had to be remembered that the blind tired more quickly than men with sight, and that many were still invalid and soon suffered from headache on overworking. The trained man was finally settled. A house was procured for him, and he was set up in business under the supervision of the after-care department to correct his work and to protect him from the unscrupulous.

Lieutenant DERWENT WOOD, A.R.A., gave a demonstration of the various stages in making a facial mask for a disfigured soldier. One patient exhibited was wearing the finished plate, and another had a pulsating wound of the cranial vertex for which a protective shield had been made covered with hair. Lieutenant Derwent Wood's procedure was as follows: A plaster mould was taken in the case of the first man, who had lost his right eye, orbital region, and the base of his nose. To do this the cavity of the wound was filled with the usual dressing, which, together with the left eye and eyebrow, was covered with goldbeater's skin, all portions of the head not wanted in the mould being bandaged. The nostrils were blocked with cotton wool. After the exposed portion of the face had been oiled, the plaster was mixed with tepid water and applied. In five minutes the mould was removed. The subsequent steps are then as follows.

The mould is dried, French-chalked, and a clay or plasticine squeeze obtained from it, giving a positive model of the patient's dressed wound and the surrounding healthy tissues. This is fixed to a board on a modelling stand and the wound is reconstructed in the model in every detail. The model completed, it is cast and the plaster positive of the wound and its environment procured. Another sitting is then obtained and the portions which are to be hidden eventually by the metal plate are modelled in clay (or wax), the edges being blended to the uninjured parts of the face, thus effectively masking any trace of wounds. This is once more moulded in plaster and, the edge of the proposed plate being marked on the negative, a cast is obtained, edges are trimmed to the marking, and the model is ready to have the artificial eye fitted to the lids. This is done from the back of the model, the plaster eyeball being dug out, the requisite thickness of the lids carefully worked down, the glass eye placed in position, and the edges of the lids made good with thin plaster. The model is now handed to the electrotyper and an exact reproduction by galvano-plastic deposit is made in virgin copper $\frac{1}{32}$ inch in thickness. This is finally well coated with silver. Bands are soldered in at the back to keep the eye in place. The plate is again fitted to the patient and strong spectacles are adjusted at a suitable angle to give a well-distributed pull on the plate. When a large plate is necessary an elastic band around the head is required. The final sittings are devoted to the pigmentation of the plate. False hair on eyebrows and eyelids were found unsuitable to withstand the weather; for the eyelashes he had adopted tinfoil split by scissors and soldered into the lids; for the eyebrows, pigment applied to the modelled forms.

Dr. JAMES B. MENNELL gave a demonstration in Limping and the Re-education of Walking. He pointed out that after injury of any sort, save that of the most trifling nature, some muscle or group of muscles always tended to waste. Even if wasting was general throughout the limb, it would nearly always be more marked in one muscle group than in others. In the performance of such a complicated action as taking a walking step most of the muscles in the body coöperated. He illustrated this by showing the effects on the gait of holding the arms in various positions, and showed that if the action of extraneous muscles had so marked an effect, lack of coördination of the muscles more intimately concerned must have a still more deleterious action. Also a weakened muscle required a longer latent period to elapse between the receipt of a stimulus and its contraction than was required in health. Hence after injury, direct or reflex, a muscle would act more slowly and more feebly than its uninjured fellows. In the re-education of walking the chief aim should therefore be to train the injured muscle up to its fellows, and the latter down to the former. In other words, coördination must be established between muscles whose relative activities had been altered. Moreover, it was just as necessary to train down the sound limb to the level of its more feeble fellow as it was to train up the latter. The demonstrator then showed how this could be done, first by simple swinging exercises of both legs in unison and alternately, then by allowing a portion of the weight to fall on the injured limb, and finally by splitting a full walking step into quarters, each quarter being practised separately until perfect coordination had been re-established.

Mr. CORTLANDT MACMAHON read a paper on Some Forms of Voice and Speech Affections in Soldiers, and described shortly the method which he had employed to remedy them, dealing in succession with shell-shock stammering, aphasia, and functional aphonia. He emphasised the value of perfectly performed breathing movements and their effect on the emotions. They were of special use in shock. The patient should lie recumbent, with the eyes half closed, and take steady long breaths, while the operator placed his hands upon the lateral thoracic regions. A rest should be taken after every six movements. Patients were told that they were undergoing a semi-hypnosis, and that by this breathing they were enabled to overcome the feelings of lost control and depression, and were improving their general health by oxygenating their blood. They were instructed to carry out similar exercises three times daily for five minutes at a time, and at night to perform them continually but more gently until sleep came. The demonstration was illustrated by records of several cases.

ROYAL ACADEMY OF MEDICINE IN IRELAND.

SECTION OF MEDICINE.

The Allen Treatment of Diabetes.

A MEETING of this section was held on Nov. 3rd, Dr. H. C. DRURY the President, being in the chair.

The PRESIDENT delivered an introductory address dealing with the position and prospects of the section, and pointed out various directions in which the work of the section might be improved and made more interesting and profitable.

Dr. G. E NESBITT read a paper on the Allen Treatment of Diabetes, and showed a case treated by the method. He detailed the procedure adopted to render and keep the urine sugar-free, and referred to the remarkable results obtained by American practitioners. The treatment was in many respects totally opposed to our previous conceptions of diabetes.

The PRESIDENT asked whether the cases reported were in any way selected as being specially suitable for the treatment; also, how it succeeded in young subjects.

Dr. WALTER G. SMITH considered that the fact that portions of the pancreas were left in the animal experiments vitiated the results. He had always divided the cases into two groups—the alimentary, which was easily controlled by suitable diet, and the endogenous, which manufactured sugar from body protein, and was hopeless. Glycosuria was not really the important thing, but the amount of sugar in the blood. He thought we knew very little as yet of the metabolism of sugar, and that it was often extremely dangerous to meddle.

Dr. T. G. MOORHEAD said that this method of treatment assumed that all cases of the disease were of the same type, which had not been proved, and he thought was not the case. Many cases got on very well on the old lines, and he would hesitate to subject these to such a severe treatment. The three cases in which he had tried it all exhibited marked acidosis.

Sir J. W. MOORE disagreed altogether with the principle of this treatment. He objected to starvation on account of the fear of acidosis. In addition to general hygienic measures, he had much faith in cascara sagrada.

Dr. A. R. PARSONS commented on the extraordinary claim that acidosis disappeared during fasting. Had any explanation been offered? He had under treatment a very severe case, with marked acidosis, and he would like to know whether the method should be tried. If this plan proved successful we would have to revolutionise our conceptions of the disease.

Dr. W. BOXWELL objected to starvation prior to operation in diabetes on the ground that it would increase acidosis.

Dr. H. BEWLEY referred to the possible injurious effect on the nervous system. He also objected to the idea of the patients testing their own urine. They would soon become hypochondriacal or insane.

Dr. G. PEACOCKE recalled a severe case in which he failed to get the urine sugar-free after three days' fast. Acidosis was present, and he did not persist further.

Dr. NESBITT, in reply, said that this treatment had been evolved after an enormous amount of accurate scientific work. It was by no means a therapeutic fad. If it proved successful, and the results obtained in large numbers of cases by American observers were remarkable, we would certainly be compelled to revise our knowledge of diabetes. The case he had shown had proved perfectly amenable to treatment. Acidosis had disappeared, as well as sugar. There were no unusual mental symptoms. For the more severe cases some modification of the fast, as recommended by Joslin, would probably be necessary. Among the American cases no selection had been made, and young subjects seemed to do particularly well by this method.

HARVEIAN SOCIETY OF LONDON.—A meeting of this society was held on Nov. 23rd, Dr. Edmund Cautley, the President, being in the chair.—In opening a discussion on the Treatment of Fractures, Lieutenant-Colonel Robert

Jones urged the necessity of deciding the guiding principles. For the ultimate restoration of the best possible function we had, he said, first, the mechanical cleansing of the wound and the free evacuation of septic fluids; then treatment of infiltrated and matted muscles and fasciæ; and, throughout, the proper alignment of the bones and adjustment of joint surfaces and spaces. In injuries about the shoulder-joint, should ankylosis occur, the hand could reach the mouth if the arm was abducted and the palm of the hand turned towards the mouth. This, then, was the position for treatment of compound or simple fractures in this region and of flail-shoulder. Injuries about the elbow-joint should be treated with complete rest in the flexed position: fractures of the forearm in supination. Injuries about the wrist should be treated in a position of dorsiflexion, the fingers being left free. After injuries to the hip joint the worst position to be feared is that of adduction, flexion, and external rotation, so that any severe compound injury at the neck of the femur should be treated with the thigh slightly abducted and extended and with the foot pointing directly forward. At the knee the position of maximum stability was one of extension, and if there be doubt as to its security it was wise to aim at slight bow-knee than risk a knock-knee, which tended to be progressive and to lead to flat-foot. Fractures at the ankle-joint should be treated so that the foot would be at right angles to the leg, and in a slightly varus position rather than valgus. In injuries to the tarsus efforts must be made to prevent painful foot or traumatic flat-foot. Fragments displaced downwards must be reduced upwards into line with the general curve of the foot or, if irreducible, removed.—Mr. J Jackson Clarke pointed out the necessity, in cases of injury at the elbow-joint, of exercising a cautious delay in obtaining complete flexion.—Colonel F. Romer, after experience at a military hospital devoted to cases of stiff limbs, thought there was too great a tendency to immobilise joints unnecessarily when the fracture was at some distance from a joint. He alluded to the fine results obtained in late stages by massage and remedial measures.—Mr. E. Laming Evans referred chiefly to the operative procedures which he used where external splinting failed to produce correct alignment and length In cases of fibrous ankylosis he thought that baths of various types were useful in preparing the part for active or passive exercises.—Mr. D. McRae Aitken said that in the forearm the ulna acted as a splint to the radius, and it was only necessary to get the ulna straight and leave the radius alone. The only point of fixation necessary for the radius was that the styloid process should be fixed down. An ulnar splint and a strap round and on the styloid process might be used. In injuries to the metacarpus the palm of the hand must be kept hollow and should be treated on something larger than a cricket-ball, otherwise the seat of fracture might kink into the palm, producing pain when anything hard were grasped.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—A meeting of this society was held at the West London Hospital on Dec. 1st. Dr. A. Saunders, the President, being in the chair.—Dr. Theo. B. Hyslop read a paper on the Psychology of Warfare. Disclaiming any attempt at political discussion or censure of the enemy as being unworthy of scientific men, Dr. Hyslop dealt briefly under the headings of Anger, Fear, Power and its Misuse, with the psychological bases of warfare. He noted certain phenomena connected with hallucinations in times of stress. With reference to clinical features in psychical war effects, he drew attention to the prevalence of functional disturbances of the nervous system, such as temporary amnesias and aphasias, and also to what he believed to be the most striking problem for consideration—namely, the unmasking of primitive instincts.—The paper was discussed by the President, Dr. H. A Smith, Dr E. F. Buzzard, Mr. A. Baldwin, and others, and Dr. Hyslop replied.

LONDON DERMATOLOGICAL SOCIETY.—A meeting of the society will be held at 4.30 P.M., on Tuesday, Dec. 19th, at St. John's Hospital, Leicester-square, W.C., when there will be a demonstration of cases and specimens.

THE air-raid casualties of Nov. 27th–28th are now officially stated as: Killed, 4 (men, 1; women, 3); injured, 37 (men 16; women, 14; children, 7).

Reviews and Notices of Books.

Gynæcology: For Students and Practitioners.

By THOMAS WATTS EDEN, M.D. Edin., F.R.C.S. Edin., F.R.C.P.Lond., Obstetric Physician, Charing Cross Hospital; and CUTHBERT LOCKYER, M.D., B.S. Lond., F.R.C.S. Eng., F.R.C.P. Lond., Assistant Obstetric Physician, Charing Cross Hospital. With 513 illustrations and 20 coloured plates. London: J. and A. Churchill. 1916. Pp. 780. Price 27*s.* net.

IN the new edition of his work on Diseases of Women Dr. Eden has secured the coöperation of his colleague Dr. Lockyer. The result is practically a new book much larger than the last edition, and with a great deal more space devoted to pathology. We may say at once that the book is a good one, and will undoubtedly have a considerable vogue among students. Possibly the share of the whole devoted to the pathology of the pelvic organs is rather excessive, but in view of the fact that one of the authors has done a great deal of pathological work in gynæcology, this was to be expected.

There are points upon which we do not see eye to eye with the authors, and others where we think they have not been quite clear. One of the most important subjects for the student is cancer of the cervix; we doubt, however, if the classification adopted by the authors will prove helpful to him. They classify carcinomata of the cervix by the character of the epithelium found in the developed growth, and not by the character of the epithelium from which they take origin. Thus they talk of a squamous carcinoma originating from the columnar epithelium of the cervical endometrium. Their statement is, of course, quite true that "almost all carcinomata of the cervix are of the squamous type," but we cannot agree that the classification of these growths is simplified by naming them not by the variety of the epithelium from which they spring but from the type of the cells they are made up of, which in the great majority of cases have undergone metaplasia, and so have lost their original character. Another confusing complication for the student is the use of the term medullary for a carcinoma spreading into the depths of the cervix, and which is therefore intra-cervical in position, the term being used in reference to its deep position and not in reference to the structure or consistence of the growth. This is, we think, a real misuse of the word medullary. This term, which had much better disappear as it is quite unnecessary, is used by practically all general pathologists to mean "a very malignant cancer of soft structure and rapid growth consisting mainly of cells"; so Cattell defines it in his medical dictionary, and so Professor J. G. Adami employs it in his Text-book on Pathology. Indeed, this has been the meaning of the term medullary as applied to any cancerous tumour for many years. One of the main difficulties encountered by teachers of gynæcology is the idea medical students so often have that the pathology of the female pelvic organs is something quite *sui generis*—a mistake fostered by the fact that many gynæcologists in their writings possibly unconsciously give this impression. The general principles of pathology are just as applicable to the pelvic organs as to any other of the organs of the body, and authors should be careful to employ phraseology and nomenclature which recognise this.

We wonder where the authors obtained the figures quoted on p. 753 as to the relative advantages of vaginal hysterectomy and the extended abdominal operation. In any such comparison it is, of course, necessary as far as possible to compare similar things—viz., the operation of extended vaginal hysterectomy with the operation of extended abdominal hysterectomy. In the report presented by Professor Dr. de Ott to the International Congress of Medicine in 1913 he showed that the proportion of cases free from recurrence for five years after the extended abdominal operation was 57·6 per cent., while after the extended vaginal operation as practised by Schauta it was 37·9 per cent., and in the reporter's own cases 34·1 per cent.—a very different result from that quoted by the authors of 62 per cent. and 12 per cent. absolute cures—that is, free from recurrence for five years after the two operations respectively. We quite agree that the results of the extended abdominal operation are the best, but at the same

time the results of the extended vaginal operation in the hands of competent operators are by no means so bad as the authors would have us believe. The section on endometritis and allied conditions is particularly good, and we are glad to see that the authors place these affections in their true perspective, pointing out how often endometritis is talked of and how comparatively rarely it is seen. The chapter on chronic metritis, a most difficult subject, is also very helpful and well illustrated. The frequency and importance of fatty changes in fibroid tumours is pointed out, as is also the relative unimportance of red degeneration of these tumours.

The book will owe a great part of its popularity among students to the large number of very excellent illustrations. Is it not time that English publishers copied their American colleagues and gave the credit that is due to the artists who draw the illustrations for the books they publish? Their work is sometimes just as difficult as, and often better done than, that of the authors; and to us it seems only right that they should be given the publicity they deserve in connexion with the success of such a book as this. Not only are their names not mentioned on the title-page but the authors do not acknowledge their debt in the preface, and in many of the illustrations the name of the artist has been deleted or does not appear. We started and we finish by saying that the book is a good one; it is full of information clearly imparted and written in an interesting way.

Nerve Injuries and their Treatment.

By PURVES STEWART, M.A., M.D. Edin., F.R.C.P. Lond., Temporary Colonel, A.M.S.; and ARTHUR EVANS, M.S., M.D. Lond., F.R.C.S. Eng., Captain, R.A.M.C. (T.). London: Henry Frowde and Hodder and Stoughton. 1916. Pp. 208. Price 8*s.* 6*d.* net.

Colonel Purves Stewart and Captain Arthur Evans have written a useful book on nerve injuries and their treatment, including not merely the peripheral nerves properly so called, but also the cranial nerves, cervical sympathetic, limb plexuses, and cauda equina. There are short chapters on methods of examination, on the symptoms produced by nerve injuries, on the conditions simulating nerve injury, and on prognosis. In the last half of the book lesions of particular nerves are discussed seriatim. Diagrams and photographic reproductions illustrate the majority of the types described. As might be expected, most of the cases quoted or illustrated are military cases. The clinical descriptions given do not go into minutiæ, but the main features of the differing symptom-complexes are exemplified in an adequate manner. It is to be regretted that the authors have not given any end-results of their operative work, so far as they have been able to observe them, although their book is based on the examination of some 316 cases seen since the outbreak of the war. On p. 7 the "external peroneal" nerve should be either the peroneal or the external popliteal nerve.

Form and Function: A Contribution to the History of Animal Morphology.

By E. S. RUSSELL, M.A., B.Sc., F.Z.S. With 15 figures in the text. London: John Murray. 1916. Pp. 383. Price 10*s.* 6*d.* net.

THIS is one of those rare books which the reviewer puts down at the first reading as not only a good one, but one eminently wanted. The volume contains a well-written history of the progress of biological thought from the time of Aristotle to the present day and the whole is woven together with admirable judgment and insight. The most striking impression left upon the mind of the reader is the remarkable manner with which Mr. Russell identifies himself with the author, whose ideas he is for the time being interpreting. He reviews each author as he falls into his place in this pageant of thought, and he does the whole with so much sympathy that it appears as though each worker in his turn were directly addressing the reader and leading him on to the stage of thought to which he has arrived. "Modern biology," the author observes, "has to a considerable extent lost its historical consciousness"; and, if that is so, we may safely assert that Mr. Russell has restored this consciousness to the subject in which he labours.

Perhaps to more than all the virtues that we have indicated we would pay tribute to that attitude which the author (with all his judicial calmness) cannot suppress—a very definite love for vitalism, a lovable regard for those "active, living, passionate beings" which constitute the material for morphological study. It is this same leaning which makes his criticism of the work of Lamarck and of Samuel Butler such delightful reading. But in a volume which treats of the subject of the inter-relation of vertebrate and invertebrate the work of Gaskell is not mentioned, nor is his name to be found in the index. Gaskell's contribution to morphological thought would have lent itself admirably to the author's agreeable method of treatment.

LIBRARY TABLE.

Chart of the Natural Progression and Co-relation in School Subjects from the Child's Point of View. By ISABEL WHITE WALLIS. London: H. K. Lewis and Co. Price 1*s.* 6*d.* net.—Milton was probably the last to survey as fully as does the author of this chart the range of school studies. It is meant "to show that school life is long enough to give sound instruction in the beginning of all those subjects that make for a liberal education, if the subjects are properly co-ordinated in the mind of the child." "Sound instruction," "liberal education," "proper co-ordination," these are the boast of all the methods devised, but different meanings are read into the terms. The author of this chart thinks that harmony will be reached if all subjects are regarded "from the child's point of view," supporting the Montessori claim for freedom; but the chart gives little guidance how to secure the interest of the child. It classifies the subject of study and suggests a sequence of lessons, from some of which every teacher will dissent and with some of which every teacher will agree. It is probably most successful in treating of geography and physics, but with no subject does it make good a claim to co-relation as a dominant feature. It separates geometry from mathematics, and handwork from both, and though modern teachers know drawing as their most efficient correlating subject, the chart asserts "music and art do not lend themselves to co-related treatment." A very suitable scheme of history for children from 8 to 10 years, is followed by a catalogue for those from 10 to 12 years, that includes "Iberians and Celts," "The Two Causes of the Great Charta," "Akkades Relation to Chinese," "Chaldea, Excavations, Smith and Layard," "Egypt—Prehistoric—Early Dynasties, Their Work." There is no teacher but would profit greatly by study of the chart and of its introduction, for the author's love of children and zeal for education are manifest, but the encyclopædist's rather than the child's point of view is too obvious in the construction of the chart, as the adjoining quotation shows.

Old Glass, and How to Collect It. By J. SIDNEY LEWIS. With 42 illustrations. London: T. Werner Laurie, Limited. Pp. 225. Price 15*s.* net.—The information given by Mr. J. Sidney Lewis, though not very recondite, is interesting and amusing; where it does not much help the intending collector the fault is not the author's. Glass is, to the superficial eye, very easily imitated, and no criteria of hallmark, as in silver, or of manufacturers' *chiffre*, as in china, are supplied. Hence the collector is largely thrown upon his own resources of historical knowledge, and especially of eye and touch, when confronted with a doubtful specimen. History is no great safeguard against forgery, for the makers generally are inspired by a knowledge equal to that of the amateur, and a trained eye or erudite touch can only be acquired by experience—notably by buying that experience. Mr. Lewis describes briefly and with effective and appropriate illustrations, the chief qualities of early English, eighteenth-century, Bristol, and Irish glass, enabling the collector to know what to look for, and encouraging him to believe that some quite good prizes may fall to his lot if he is industrious. A very interesting chapter on memorial glasses makes it plain that the "fiat" glasses which used to be an inevitable article in the old curiosity shop were generally spurious.

The jackdaw spirit is rife in the medical profession, and Mr. Lewis introduces us to a pleasant method of indulging it. But he cannot be said to be urgent in his invitation to new amateurs to join in a sport at which he is so proficient, for his closing words warn the man who thinks that in collecting glass he may be investing money, that now he is able to buy at the top of the market in time for an impending fall. The book is beautifully got up, illustrated, and printed, but the proofs might have been read more carefully, for the repetitions are annoying.

THE LANCET.

LONDON: SATURDAY, DECEMBER 16, 1916.

Trinitrotoluene Poisoning.[1]

AN official communication has been made to THE LANCET by the Ministry of Munitions, dealing with the dangers incurred by those working in the manufacture of the well-known high explosive trinitrotoluene. These dangers, as soon as they became obvious, were met with administrative measures for their control; immediate medical supervision of the factories was instituted, and scientific investigations into the toxic properties of the substance and their deleterious mode of action were undertaken. As a result much accurate information was soon obtained and communicated to all the responsible medical officers. The Ministry of Munitions have now wisely determined that the knowledge thus at their disposal shall be brought to the notice of medical men outside the factories, on whom devolves the duty of notifying toxic jaundice contracted in a factory or workshop; and this has been done in a plain and sensible document, supplemented by precise instructions for performing a urinary test for the detection of trinitrotoluene. The communication of the Ministry of Munitions will further be of use in that its contents are calculated to allay much of the widespread apprehension of the public as to trinitrotoluene poisoning. The fact that there is danger to the health of those engaged in the manufacture of trinitrotoluene is not concealed, but the amount of that danger is estimated and shown to have been much exaggerated in the popular mind, where also other forms of toxic affection have been confused with trinitrotoluene poisoning, to which they bear a superficial likeness. But while the effects of working with tetryl and picric acid, the poisons in question, are readily mistaken for those of trinitrotoluene, the constitutional symptoms in poisoning by the last are far more serious. It is well that the public should understand that all those whose skin displays a yellow, an apricot, or a greenish stain are not necessarily working in particularly perilous circumstances.

Before the outbreak of war, and, indeed, some ten years ago, Dr. WALTER MALDEN wrote a report on the blood results produced by anilin and nitrobenzol compounds in those engaged in dyeing, and the circumstances of dinitrobenzene poisoning came under examination.[2] Dinitrobenzene, which is readily absorbed by the skin, was found to produce blood changes of varying severity, while in a few cases toxic jaundice occurred, and toxic jaundice is an ominous stage in trinitrotoluene poisoning. The points of analogy between dinitrobenzene poisoning and trinitrotoluene poisoning are rendered additionally interesting by the resemblance of both conditions to chloroform and to "dope" poisoning. In September and October, 1914, when the outbreak of war was leading to enormous activity in our aeroplane factories, the occurrence of illness associated with a pernicious form of jaundice was noted at the Hendon aeroplane factory and other similar factories. An inquest conducted with great ability by Mr. LUXMORE DREW into the death of an operative at the Hendon aeroplane factory, who had been an out-patient at St. Mary's Hospital, led to an inquiry, at which Colonel W. H. WILLCOX, senior scientific analyst to the Home Office, was associated with Dr. T. M. LEGGE, medical inspector of factories, in the investigations.[3] As a result, the cause of death was traced to a degeneration of the liver following absorption of tetrachlorethane contained in the cellulose varnish, or "dope," used in the factories. When, therefore, cases of poisoning among the operatives in trinitrotoluene occurred, the authorities were not taken by surprise. They had a good deal of accurate information to work upon, for they were familiar with the occurrence of toxic jaundice in association with other forms of industrial poisoning, and it is due to these facts that it has been possible for the Home Office and the Ministry of Munitions to arrive at prophylactic measures of a valuable sort in a short space of time against trinitrotoluene intoxication.

These measures are founded in the first instance on the fact, which is clearly brought out in the official communication, that certain workers in trinitrotoluene have an idiosyncrasy towards toxic absorption, and that youthful operatives are especially liable. The workers, it appears, can be divided into two classes, the larger one remaining insusceptible from the first and however much exposed they may be to this form of poisoning, while a smaller class is liable as a rule to show symptoms of intoxication between the beginning of the fifth week and the end of the fourth month. The fatality among quite young operatives is so striking that one of the first preventive measures indicated is that only persons in good health, and as far as practicable over 18 years of age, should be employed in trinitrotoluene factories—in the Royal Arsenal the age-limits are from 20 to 50. The general precautions in factories where trinitrotoluene is being made include the frequent medical examination of all employed and the alternation of work or reduction of shifts where possible, as well as the adequate ventilation of the workshops. In the official communication stress is also laid upon the provision of a good canteen on the premises, while it is pointed out that workers should have the dangers explained to them of sleeping in the clothing which they have worn at the factory and of not being careful in their ablutions, especially before meals. We have called attention to the similarity, especially in the initial symptoms between trinitrotoluene poisoning and certain other industrial intoxications; the

[1] The full communication will be found on p. 1026.
[2] THE LANCET, July 15th, 1916, p. 115.
[3] THE LANCET, March 13th, 1915, p. 544.

practitioners, therefore, to whom the communication of the Ministry of Munitions is directly addressed will welcome the addition of a urinary test whereby the characteristic reactions of trinitrotoluene can be obtained, and an early diagnosis be made.

The Law and the Medical Mystic.

WE noted recently a judgment which has been delivered in the New York Court of Appeals and which may have the unfortunate result of leaving Christian Scientists in the State of New York to carry on their silly and dangerous practices without interference, unless a new trial sets the confusion right. By the judgment the acts of the Christian Science healer were removed from the realm of quackery to that of religious thought, a technical misdirection in a lower court having led necessarily to the decision of the appeal tribunal. This sort of dilemma is inseparable, it appears, from the working of elaborate legal codes. While we regard with disapproval teachers and preachers, whether of religion or of social amenities, who would influence their flocks to submit themselves to healers, we do not desire to see any stretching of a law passed for a particular kind of offence, so as to make it include acts which it was not intended to punish, and to which in its ordinary meaning it cannot be applied. But the "religious" tenets of the Christian Science Church encourage dangerous quackery; they deserve no peculiar sympathy because many Christian Scientists are amiable people, and they should not escape the penalties of any legislation designed to check quackery.

In this country the immunity of charlatanism is at last receiving public attention, and reform will follow. For if the people in a self-governing State wish to protect themselves or their relatives and neighbours against the dangerous meddling of religious fanatics, or bogus medical men, they can always secure the passing of a law which will have the desired effect. The disciples of Mrs. EDDY are numerous in the United States, and at present in at least ten States the "Christian Science Church" is expressly exempted from the prohibitions which forbid unqualified medical practice in those States. In the State of New York the law is framed in terms that have led to a like result. In this country matters are different. We have fewer "Christian Scientists" among us, and the adherents to Mrs. EDDY'S doctrines comprise no leaders in the intellectual world; but we possess a great variety of religious sects and a considerable inclination towards religious toleration, and respect for the beliefs of other people. We also allow any quack and impostor to treat the public for their ailments as long as he does not assume a medical title or a colourable imitation of one. We hope and think that this state of affairs will not last much longer; the feelings of the public against quackery have undergone a wholesome change under the stress of the war.

The progress of medicine and surgery during recent years, coupled with the achievements in science in the present war, have brought this awakening intelligence about: the recommendations of the Royal Commission on Venereal Diseases, and the State control of these diseases now being set in motion throughout the country, should have a further and prompt effect. When the State begins to pay for treatment the necessity of having that treatment supplied by a properly educated profession is at once seen, and so is the danger to the public that underlies the pretensions of quacks as set out in advertisements. The attitude of the coming generation towards the Christian Scientists, the Peculiar People, and their similars is difficult to forecast. A recent writer[1] sums up his view of the Christian doctrine of health in the words: "The man who believes that the spirit has power to heal and invigorate the body, believes all matter to be pervaded and informed by spirit, to be the expression of spirit." Persons holding such views can hardly be classed indiscriminately with herbalists, nostrum vendors, and "bogus doctors." A distinction may also be drawn in their case between those who believe in the effect of coöperation in prayer on behalf of one another, and those who for gain cover their eyes and remain silent for 20 minutes in order that a stranger's disease may be arrested. In framing laws to control quackery, while leaving free the genuine religious feelings of the people, we shall have difficulties whenever religion and therapeutics get fused into a creed; and yet the efficacy of prayer, even supposing we confine it to suggestional influence, is undoubted. We hope that when legislation takes place the position of the religious trifler with disease may be clearly defined after due discussion; and we hope also that loopholes will not be left in any penal regulations that may be framed by which escape will be assured for mischievous meddlers merely because they can claim good intentions.

[1] The Christian Doctrine of Health: A Handbook on the Relation of Bodily to Spiritual and Moral Health. By the author of "Pro Christo et Ecclesia." Macmillan and Co. 1916.

THE LANCET, VOL. II., 1916: THE INDEX.

THE Index and Title-page to the volume of THE LANCET completed with the issue of Dec. 30th will be ready early in the New Year. Owing to the continued shortage in the paper-supply, the Index will not be issued with all copies of THE LANCET, as was the custom prior to the War. Subscribers who bind up their numbers are requested to send a post-card to the Manager, THE LANCET Office, 423, Strand, London, W.C., when a copy of the Index and Title-page will be supplied free of charge.

LITERARY INTELLIGENCE.—Messrs. Baillière, Tindall, and Cox announce that they have in preparation for early publication a work by Dr. R. Fortescue Fox, entitled "Physical Remedies," and presenting in a convenient form the information which is necessary for practical treatment by mechanical apparatus, exercises and medical gymnastics, heat and cold in baths, by electricity and radiation, by massage, as well as by medicinal waters in the British health resorts. The same publishers are issuing within the next few weeks a work entitled "The Organs of Internal Secretion: Their Diseases and Therapeutic Application," by Dr. Ivo Geikie Cobb.

Annotations.

"Ne quid nimis."

MENINGOCOCCUS SEPTICÆMIA.

INSTANCES of generalised meningococcus infection without meningitis are of importance both on account of the light they throw upon the pathogeny of cerebro-spinal fever and from the point of view of preventive medicine. A case of this character is recorded by Dr. W. M. Elliott in another column. Complete proof of the nature of the case, it seems, was not forthcoming, for by some mischance the blood was not cultivated, and from the highly septicæmic nature of the symptoms it is extremely likely that a positive culture would have resulted. It is even claimed by some observers that in analogous cases blood films may show meningococci, demonstrable by intracellular disposition and staining reactions. Nor was the bloody fluid in the vesicles on the legs searched for the specific organisms, a procedure which yielded some positive results in Sophian's work during the Texas epidemic. But although the absolute pathological proof is lacking in Dr. Elliott's case, he offers very strong relative pathological evidence, consisting of marked agglutination by serum with a dilution of 1 in 25, and, of greater value, a strongly positive result from the complement-fixation test. These two facts, together with the petechial character of the eruption and the occurrence of an undoubted case of cerebro-spinal fever in the same barracks a short time previously, make it highly probable that the case described was one of meningococcus septicæmia. The incidence of such cases as this is probably not very uncommon. They deserve more careful investigation, both along the lines of direct blood examination and of serum reactions. It is probable that the cases are more common in the early part of the cerebro-spinal fever season. The condition should be suspected whenever the practitioner is faced with a sudden febrile illness of doubtful nature accompanied by a petechial eruption, or by herpes. Incidentally we may remark that acute "septic" arthritis, arising without adequate explanation, such as a co-existent urethritis, may be another manifestation of meningococcus blood infection. Dr. Elliott says that his case "falls into the so-called septicæmic class of cerebro-spinal fever as described by Mr. Lundie, Mr. Thomas, and Mr. Fleming." But the thesis advanced by these authors was that *all* cases of cerebro-spinal fever passed through a septicæmic stage, whether or no they developed meningitis, which they regarded as almost accidental to the disease. This thesis has been discussed fully in recent monographs on the subject by Horder, Foster, and Gaskell, and the criticism, in view of all the facts, has been adverse. The occasional occurrence of a case like that described by Dr. Elliott contravenes rather than confirms the thesis. All the same, we note that in a still more recent contribution to the literature of cerebro-spinal fever by Messrs. Fairley and Stewart[1] the thesis is regarded, for purposes of a chapter on symptomatology, as established. But a good deal of the evidence adduced by these authors in favour of regarding cerebro-spinal fever as consisting of a catarrhal, a septicæmic, and a meningeal stage appears to us to be open to criticism. Thus it is said of an outbreak of naso-pharyngitis at a military camp at Seymour, Victoria, that it is reasonable to assume that the outbreak was in reality an epidemic of catarrhal cerebro-spinal fever, because the epidemic took place immediately before and during the time when a large number of cases of actual meningitis occurred there; also bacteriological examination of "many" of the throats showed meningococci. But neither of these facts proves the point at issue at all. This Australian monograph contains valuable observations on matters of differential diagnosis, while the conclusion is arrived at that the results of procedures of any magnitude are not such as to justify them. Simple ventricular puncture should, however, be persisted in with the hope that ultimate re-establishment of drainage may result. And for acute cases, when respiratory failure occurs, venesection is recommended. The last chapter of this work records the observations of Guest and Fairley upon the use of hexamine and its derivatives as intra-spinal antiseptics, with the conclusion that, by whichever route administered, oral or intrathecal, the drug is very disappointing.

[1] Commonwealth of Australia Quarantine Service, Service Publication No. 9.

EPSOM COLLEGE.

YEAR by year for more than half a century we have urged the claims of Epsom College on the consideration of our readers, and this consideration is doubly necessary now that many annual subscriptions have been lost on account of the war and others because of the engagement of medical men on military duties away from their homes. The last annual report showed that the Foundation and the Trustee Funds had rendered assistance during the year to 100 pensioners, medical men or the widows and aged daughters of medical men, as well as boarding and educating 50 sons of medical men at the College. It is just this kind of help which the special circumstances of the war render more than ever necessary for the medical profession. No other medical benefit can take the place of a foundation with these objects and achievements. The Foundation should command more subscriptions now than ever before and be a first claim on anything like "war profits," if such there be amongst us.

A BULLET FREE IN THE LEFT VENTRICLE.

IN the present war several cases have been recorded of survival after a bullet had penetrated the heart, and in one at least the projectile was successfully removed from the left ventricle. But at a meeting of the Académie de Médecine on Nov. 7th M. Lobligeois reported a case in which complete recovery took place while a bullet remained, and presumably remains, free in the left ventricle. The details of the case, as it is recorded, can only be called surprising. The patient was a soldier who had been wounded several months previously, and was sent to M. Lobligeois to verify the state of the left lung and ascertain whether a projectile existed which the patient always said he had in his chest. He had no trouble of any kind. Radioscopy at once showed, it is said, a shrapnel bullet in the cardiac area, and careful examination enabled M. Lobligeois to conclude that it was free in the left ventricle. Its whirling movement with each cardiac pulsation was described

as characteristic, which would imply that the behaviour of bullets loose within the heart had been studied. At the end of the diastole the bullet rested on the inferior border of the heart near the apex. With the systole it rapidly veered from left to right, following the lower border of the heart, and then evidently encountered the interventricular septum and followed this from below upwards in a vertical line. It thus attained the highest point of the ventricle on its right border at the end of the systole. It rested there an instant and then slowly descended during the diastole from above downwards and to the left so as to regain at the end of this period its position at the apex and recommence the movement. It thus described a right-angled triangle with the right angle a little rounded. The rapidity with which it moved during the systole along the two sides of the triangle contrasted with the slowness of its movement during the diastole along the hypothenuse. M. Lobligeois pointed out that only radioscopy could have disclosed these remarkable phenomena. We hope that the progress of this case is being carefully watched.

THE PRESCRIBING OF COCAINE.

BY an amending Order dated Dec. 5th some amendments have been made in the Defence of the Realm Regulation 40 B relating to cocaine and opium, of which the following are the most important: 1. Power is given to the Secretary of State to issue licences for the manufacture of cocaine in this country. Any person manufacturing or carrying on any process in the manufacture of cocaine without a licence or otherwise than in accordance with the conditions of the licence will be liable to a penalty. 2. A medical practitioner who gives a prescription for the supply of cocaine otherwise than in accordance with the conditions laid down in the Regulation is made liable to a penalty. 3. Every article containing cocaine must be marked with the amount and percentage of cocaine contained in it. 4. Power is given to the Secretary of State to direct that any person authorised under the Regulation to purchase cocaine or opium who is convicted of an offence against the Regulation or against the Proclamations regulating the import or export of cocaine or opium shall cease to be an "authorised person." 5. The authorisation in the case of registered chemists and druggists is limited to persons, firms, or bodies corporate who carry on the retail business of a chemist and druggist. The expression "authorised person" includes a duly qualified medical practitioner, a registered dentist, and a registered veterinary surgeon.

THE COURSE OF PREGNANCY IN A DOUBLE UTERUS.

WHEN the two halves of a double uterus are entirely separate one, or both, may be the seat of a pregnancy, or the two halves may become pregnant alternately. In the majority of these cases labour occurs naturally. The non-pregnant half, if entirely detached, may continue to menstruate, or more commonly it forms a decidua, which is discharged either at the time of birth or soon after. If pregnancy occurs simultaneously on both sides the children may be of different stages of development, and no doubt such a multiple pregnancy is the explanation of most of the cases of so-called superfœtation. Abnormalities during pregnancy or labour, however, sometimes occur. Abortion is not uncommon, and in some cases there is undue thinning of the walls of one or other half of the uterus and rupture may take place. Undue rigidity of the cervix may predispose to this accident. The muscle tissue may be poorly developed, and this leads not only to weak pains and to a prolonged second stage, but also to abnormalities of the third stage of labour. The pregnant half, or even the non-pregnant half, of the double uterus may become incarcerated in the true pelvis and so give rise to obstruction to delivery. In one recorded case the smaller half was incarcerated in the pelvis and contained the placenta, the external os being situated half-way between the symphysis pubis and the umbilicus. When the two halves of the uterus are only partially separated from one another, forming one of the varieties of uterus septus, abnormalities of childbirth are less frequent. When they do occur they affect mainly the third stage of labour, as in the case recorded on p. 979 last week by Dr. M. C. S. Lawrance. When in a uterus bicornis the fœtus is in one horn and the placenta in the other, as is not infrequently the case, the separation of the placenta may be imperfect, and accompanied by severe post-partum hæmorrhage. In some cases the placental site is situated partly in one half and partly in the other half, and it has been suggested that the bleeding is due to the two halves of the uterus not contracting synchronously. In one recorded case the opening into the horn containing the placenta was so small, admitting only three fingers, that great difficulty was experienced in delivering the placenta. Besides abnormalities of the third stage of labour, malpresentations often occur in uteri of this kind. Transverse and breech presentations are relatively common, and it has been suggested that the fœtus may be best accommodated to the shape of the double uterus when one portion, such as the head, is lodged in one side and the remainder of the fœtus in the other side. It is probable that the case described by Dr. Lawrance was an example of a uterus subseptus with the two halves of the uterus unequally developed.

THE REGISTRAR-GENERAL'S QUARTERLY RETURN.

IN preparation for the Census of 1911 important modifications were adopted by the Registrar-General in the schedules and tabular forms required for that process, by virtue of which substantial improvements are apparent in his recent official returns and reports. The return for the fourth quarter of 1915 was enlarged by inclusion of the tabular matter originally contained in the "Annual Summary," which is now discontinued as a separate publication. The present return, which is published by Wyman and Sons (pp. 75, price 1s.), relates to the third quarter of the current year, and contains particulars of natality and mortality in the constituent areas of England and Wales during the 13 weeks ended Sept. 30th. A table of the deaths in England and Wales by sex, age, and cause during the fourth quarter of 1915 is incorporated in this issue, and similar tables are promised from time to time in future returns. In this table, which is uniform with the extended table now appearing in the annual reports, the deaths are distributed over 189 separate causes, at 26 groups of ages. But the value of this information, great as it is, will be fully appreciated only when the data for a long series of years are available for study and comparison. In the absence of reliable

data the population of England and Wales is assumed to have numbered 36½ millions at the middle of last year. Computed on this population the births registered in the third quarter of 1916 corresponded to a rate of 21·7 annually per 1000 living. The illegitimate births exceeded by 1218 the numbers thus returned in the corresponding quarter of 1915. The natural increase of the population last quarter, by excess of births over deaths, was rather more than 95,000, against 112,000 in the third quarter of the year preceding the outbreak of war. The deaths, civilian and non-civilian, were equal to 11·2 per 1000 annually. This figure cannot readily be compared with the rates of the previous ten corresponding quarters, because Table II. of previous returns, which gave this information, has been temporarily discontinued. Infant mortality last quarter was lower than in any other third quarter except that of 1912. It was equal to 79 per 1000 births, and was 41 per 1000 below the average in the corresponding periods of the previous ten years. An interesting table (VII.) shows the deaths of infants under 2 years from diarrhœa and enteritis in each of the 96 great English towns, compared with the average for the country generally. The counties of Lancashire and Durham are conspicuous as indicating excessive loss of life from these obviously preventable causes. Another useful table indicates the death-rates from these causes, at similar ages, in successive weeks of the quarter, the rates in excess of the average being shown by distinctive type. This table will be appreciated by the medical officers of health of the several towns, who will doubtless desire its continuance in future years. The usual tables are included showing the deaths from the more familiar infectious diseases, and these may be studied in relation to the records of reported attacks by notifiable diseases in Tables X. and XII. The tables for the metropolitan boroughs are somewhat more extended than those for other parts of England, whether relating to mortality or to incidence of infectious disease. Thus the metropolitan records alone show the deaths and mortality per 1000 of the civil population from pulmonary tuberculosis, indicating enormous differences in its fatality among the several areas. Moreover, the London tables give particulars, additional to those of the provinces, respecting the notification of cerebro-spinal fever, anthrax, glanders, ophthalmia neonatorum, and poliomyelitis. As in previous returns, the local rates of mortality from the principal epidemic diseases are compared. In the 96 great towns the highest rates were as follows: From enteric fever, 0·24 per 1000 in Great Yarmouth; from measles, 1·14 in Wolverhampton; from scarlet fever, 0·24 in Carlisle; from whooping-cough, 0·65 in St. Helens; and from diphtheria, 0·83 also in that town.

THE LATIN-LESS MEDICAL STUDENT.

THE General Medical Council, in deciding last week to register the medical student who has not taken Latin in his entrance examination to the medical faculty, were not departing from their declared policy. The compulsory inclusion of Latin in the curriculum of the school-boy destined to become a doctor was not designed to help him in the understanding of anatomical and pharmaceutical terms, nor to provide him in his professional life with one of the familiar appurtenances of culture, but to ensure a mental training sufficient to enable him to engage in medical study and to continue the development of his mind during the process. For 14 years London University has made Latin optional in its medical entrance examination, and no evidence has been brought forward to show that any hindrance to the medical student's mental development has resulted. For almost as long the Conjoint Board has accepted this Latin-less examination as a portal to their own diplomas. Birmingham, Leeds, Liverpool, and Sheffield have followed London's lead, and Manchester has admitted the same principle by placing Latin in the list of optional subjects for matriculation in other faculties. That the mental equipment of the leaver from a modern secondary school where a sound knowledge of applied mathematics, of two modern languages, and of the beginnings of physical science is obtained, is less suitable as a groundwork for his medical training than that of a classical scholar is no longer seriously maintained. The framers of our language have, moreover, fortunately for the medical student, been so omnivorous in the past that practically all the Latin and Greek roots necessary for the appreciation of medical terminology have been absorbed into the common tongue and are already familiar to the careful student of his own language.

EXTRAPLEURAL THORACOPLASTY IN PULMONARY TUBERCULOSIS.

AT the meeting of the Scandinavian Surgical Association held at Göteborg this summer, Professor P. Bull, of Christiania, gave an account[1] of 11 cases in which he had operated during the last two years for the relief of unilateral pulmonary tuberculosis. The operation consists in removal of portions of the ribs. The object of operation is to secure the complete collapse of the infected parts of the lung. Professor Bull emphasised the importance of removing the posterior segments of the ribs overlying the affected parts of the lung; to remove only portions anterior to the angles of the ribs is, he says, necessarily unsatisfactory and inadequate. The costal cartilages and anterior portions of the ribs, on the other hand, need not be cut away, as, owing to their anatomical relations, they are capable of falling in when the underlying lung collapses as a result of the operation. In general he advises that the operator should aim at removing 10 cm. of the tenth and ninth ribs and about 15 cm. of each rib from the eighth to the fourth. If it is the upper lobe of the lung that is involved it is essential that from 10 to 13 cm. of the third and second ribs also should be dissected out. He points out that the scapula cannot fall inwards unless all the ribs upon which it rests—namely, the second down to the seventh or eighth—are dealt with. In one case he removed the first rib from behind, a difficult operation. Such extrapleural thoracoplasty as Professor Bull describes is indicated in cases of unilateral pulmonary tuberculosis as have failed to obtain benefit from other methods of treatment. It is contra-indicated if there is any clinical evidence of active tuberculosis in the other lung. Four of the eleven patients were cured, three died as a result of the operation, two succumbed a year later from their disease, and one died from intestinal tuberculosis. Dr. A. Christensen described the success with which he had carried out similar operations in five cases, without a fatal result. One patient, aged 24, had had tuberculosis of the right apex for 12 years. Treatment by artificial

[1] Tidsskr. f. d. Norske Laegeforening, Christiania, 1916, xxxvi., 849.

pneumothorax was attempted in 1915, but failed. Then the first and second ribs were dissected out from in front, but little benefit was obtained. At a second operation portions of the ribs from the third to the eleventh were removed, from their angles forward. The patient was up in a fortnight and left hospital vastly improved five weeks after the operation. Three of the other four patients did well after the operation. Local anæsthesia is recommended, and Dr. Christensen advises that the patient should be sitting up during the operation, which is likely to take from one to two hours in its performance.

NOTIFICATION OF BIRTHS.

A QUESTION was recently asked in the House of Commons calling attention to the report of the medical officer of health for Cumberland, which showed that in that county in the case of 2574 births notified in accordance with the law there was a death-rate of 68 per 1000, whereas 1476 births which had not been notified showed a death-rate of 147 per 1000. With regard to the extraordinarily large number of instances in which the law had not been complied with the President of the Local Government Board stated that the Cumberland county council had undertaken to take steps to secure better notification in future. The importance of a special effort being made by the county authorities to carry out duties recently imposed upon them—and no doubt not easy to provide for at the present time, when so many officials are absent—is proved by the two death-rates quoted. It is easy to understand that where notification of any kind to a public authority is prescribed, those who seek to evade the obligation will be precisely the class whose compliance with the law is of the greatest importance to the community. No one need be surprised, therefore, at the death-rate being higher among infants whose arrival in the world is not notified immediately to the medical officer of health, but that it should be more than twice as high is of real significance. The serious comparative mortality accompanying non-notification shows that there is a substantial wastage of infant life which may be brought under control and considerably diminished through the strict enforcement of notification, followed by measures which notification renders possible, and this fact should stimulate other county councils than that of Cumberland to increase their efforts. Universal notification is, of course, of but modern date. The Notification of Births (Extension) Act, 1915, which ordered that the tentative and adoptive Act of 1907 should extend to every area in which it was not already in force, has not yet had a chance of proving its usefulness by statistics collected over a long period throughout the kingdom. The Act was passed, however, at a time when any trustworthy figures proving that infant lives are wasted should attract immediate attention, for the loss of adult male lives and the diminished usefulness of a vast number of survivors are two sad things which are being forced upon our notice more urgently every day. There are administrative and sentimental difficulties in the carrying out of the Act, but successful administration seems to be a question of care and sympathy rather than of increasing the powers given by the law.

THE library and offices of the Royal Society of Medicine will be closed from 2 P.M. on Saturday, Dec. 23rd, to Thursday, Dec. 28th, inclusive.

TRINITROTOLUENE POISONING.

OFFICIALLY COMMUNICATED BY THE MINISTRY OF MUNITIONS.

BEFORE August, 1914, there had been little practical experience of the toxic action of trinitrotoluene (T.N.T.). No ill-effects had been observed from the small quantities used, and it was generally believed to be much less toxic than dinitrobenzene, which had been manufactured in this country on a small scale for many years and been used as an ingredient of explosive powders in a proportion rarely exceeding 15 per cent. During the past year, however, T.N.T. has shown itself to be dangerous to the health of at least a minority of workers coming into contact with it, and has produced fatal toxic jaundice in 50 cases out of many thousands of workers engaged.

As soon as the dangers from T.N.T. became obvious, administrative measures for their control, including medical supervision in all the factories, were taken and scientific investigations into the modes of action of T.N.T. were organised. Whatever light is being thrown upon T.N.T. poisoning by such investigation is communicated to the responsible medical officers in the factories concerned for their guidance. Many cases of illness, however, attributed rightly or wrongly to T.N.T. poisoning, have, or may, come to the notice of medical men outside the factories, and it appears desirable accordingly to make generally known to them the present state of knowledge in this matter, as on them now devolves the duty of notifying toxic jaundice contracted in a factory or workshop, to the Chief Inspector of Factories at the Home Office, London. Apart from such statutory notification, communications from medical men based on observations of any serious effects attributed to T.N.T. would be valued, and might be addressed to the same quarter. It is hoped to make in the early future further communications of results obtained by investigation.

Trinitrotoluene, also known as T.N.T. and trotyl, is a high explosive obtained by nitrating toluene—a product of coal-tar distillation. Toluene is a benzene compound in which one hydrogen atom of benzene (C_6H_6) has been replaced by the radicle CH_3. In the process of nitration three other hydrogen atoms are replaced by the nitro radicle (NO_2), and the formula for T.N.T. may be written, $C_6H_2(NO_2)_3CH_3$. This body is solid at ordinary temperatures, in which state it can be reduced to a fine powder; it melts at about 80° C.

When the skin or hair is exposed to T.N.T. by contact, a characteristic yellow or tawny orange stain is produced, which lasts in the integument for some weeks. Derivatives of T.N.T. produced by the action of alkalies have characteristic colours; if a dilute solution of T.N.T. is treated with alcoholic potash, a deep pink colour changing to purple and then turning brown results. Skin which has absorbed T.N.T. has a bitter taste to the tongue, which is removable by solvents of T.N.T. but not by water, as in ordinary washing.

T.N.T. is soluble in oils and greases as well as in acetone, ether, benzene (benzol), xylene (xylol), and other compounds, and the importance of this will be referred to later. Alkaline alcohol changes the yellow stain in the skin to pink or purple, and the T.N.T. thus chemically changed is soluble in and can be washed out by water.

T.N.T. is used alone as a fine powder, or in a flaked condition, or in the molten state from which T.N.T. in vapour escapes and is deposited in the form of a fine crystalline sublimate upon any surface of lower temperature than about 70° C. When mixed with 40 per cent. to 60 per cent. of ammonium nitrate it is known as amatol, and with 20 per cent. of ammonium nitrate as ammonal. T.N.T., as used, is often impure and contains traces of dinitrobenzene and other similar bodies, but investigation has produced no evidence of its poisonous properties residing in impurities. Pure and crude T.N.T. are equally toxic, and in no cases have the separated impurities been found more potent than pure T.N.T. The separate T.N.T. isomers have also been carefully tested, and their toxicity appears to lie either at or slightly below the toxicity of T.N.T. Of the cases showing jaundice about 27 per cent. have arisen from pure T.N.T., 67 per cent. from amatol, and 6 per cent. from ammonal. Possibly the hygroscopic nature of ammonium nitrate may assist absorption through the skin.

DINITROBENZENE POISONING.

A natural guide to the new experience of T.N.T. toxicity is to be found in the older knowledge of that due to dinitrobenzene (D.N.B.). It has long been known that D.N.B. may be readily absorbed by the skin, and it may be supposed that this absorption is affected or aided by the solubility of D.N.B. in the cholesterin fats of the skin or of greases used either in factory processes or as ointments. It may, perhaps, pass through the skin by the mechanical inunction of minute particles.

The most obvious results of D.N.B. poisoning by skin absorption are changes in the red blood corpuscles. As in nitrite poisoning, there is a conversion of oxyhæmoglobin to the more highly oxidised form methæmoglobin, and this change, if large in amount, produces breathlessness and cyanosis (both removable by breathing pure oxygen), which last until the body has been able to reduce the methæmoglobin to the natural form. Beyond this simple chemical result there may be, when the poisoning is more severe, hæmolysis, with degeneration of the corpuscles and escape of methæmoglobin into the plasma. In severe cases evidence will be found not only of destruction of the red corpuscles, but also of activity in the blood-forming organs; nucleated red corpuscles may be found in severe cases, with evidence of imperfectly developed corpuscles, as shown by the occurrence of basophile granulations, polychromasia, and variations in shape and size. Lymphocytosis may also occur.

If the dosage of absorbed D.N.B. is not too great, blood formation seems able to keep pace with blood destruction; cessation from work for a short time enables the blood to recover rapidly from the effects of poisoning.

In D.N.B. poisoning these effects upon the blood are by far the most prominent feature. In very rare cases toxic jaundice may occur. Thus, in 1906 a dinitrobenzene worker after three months' employment died in the Huddersfield Infirmary, having been admitted for symptoms of cyanosis, vomiting, jaundice, and dyspnœa. Post mortem the liver was stated to have resembled that of acute yellow atrophy.

These facts suggest that (*a*) while D.N.B. upon absorption produces in all persons alike its chemical effects in the blood, varying in degree according to dosage (this being dependent again upon conditions of work, precautions taken, and perhaps upon varying greasiness or permeability of skin), and according to individual powers or opportunities for blood recovery; (*b*) it produces as an additional phenomenon liver degeneration only in a small minority of persons in whom the body cells are specially susceptible to the poison.

CHLOROFORM AND DOPE POISONING.

Upon this view of D.N.B. poisoning, an analogy to it may be found in chloroform poisoning. In the vast majority of patients chloroform only shows its anæsthetic action. In a very small minority, however, it may also give rise to degeneration of the body cells especially of the kidney or of the liver, and in the latter case it may kill by liver degeneration and atrophy, with accompanying "toxic jaundice."

A further analogy may be drawn from facts recently made prominent in connexion with the toxic jaundice, which became serious in this country for the first time towards the end of 1914 among persons employed in "doping" aeroplane wings, as the result of the presence in the dope of tetrachlorethane ($C_2H_2Cl_4$), which, inhaled as a vapour, acts upon nervous centres, and is also a powerful liver poison. The toxic jaundice so caused has now happily ceased since tetrachlorethane has no longer been an ingredient of any aeroplane dope. During the time of its use at least 70 cases of jaundice with 12 deaths are known to have occurred. In the fatal cases the liver and kidneys were always the organs principally affected, and with changes indistinguishable from those to be described as induced by T.N.T. Alteration in the blood was absent, thus distinguishing the cases from toxic jaundice caused by nitro-derivatives of benzene and toluene. Here, then, we have a body, closely allied chemically to chloroform, which, while the anæsthetic properties as used industrially are not so prominent, finds a much larger number of persons susceptible to its toxic action on the liver.

TRINITROTOLUENE POISONING.

In view of the old experience of D.N.B. poisoning, it would appear *a priori* likely that T.N.T. can be absorbed in a dangerous degree by the skin, and recent experiments establishing this absorption will be mentioned below. Fine dust and fumes will reach, besides the exposed skin surfaces, the mucous membranes of nose and mouth—perhaps even the lungs themselves—and must inevitably be swallowed either in the saliva or with the mucous secretions from the nose and windpipe.

T.N.T. may be recovered unchanged from the fæces, and is probably there present in most of the workers. In the urine it does not exist free except by contamination during collection, but in the great majority of all workers it is present in greater or less amount in the urine, though in a combined state. In properly collected urine, not directly contaminated with T.N.T. dust, T.N.T. solvents fail to extract any of the substance. Its presence may be shown, however, by liberating it by acid from a compound in which it is fixed, when it may be revealed by its ordinary reactions. This urine test will be given in detail below. Further investigation is now in progress, but it would appear probable that free T.N.T. in the intestine is combined in the presence of reducing substances, just as other aromatic bodies in ordinary digestion of proteins are converted to ethereal sulphates, and so eliminated harmlessly by the kidney.

It appears at present best to group the symptoms of the poisoning under the following heads:—

1. *Dermatitis.*

This appears to be due to a direct irritant action upon the skin. Some persons are more susceptible to it than others; the effects, like those of other irritants, are increased by flushing and perspiration, and by mechanical friction. Further details will be given below.

Some observers have thought that persons specially susceptible to dermatitis are in some rough proportion less susceptible to T.N.T. poisoning in the other ways to be mentioned. If further observations show this to be true, it may be a sign that some skins hold the T.N.T. in combination and suffer local irritation, while other skins allow a readier passage of it to the blood.

2. *Digestive Troubles.*

Gastritis, with abdominal pain, vomiting, constipation (a very constant symptom) with flatulence and distension, may all be early symptoms, and may appear in the absence of actual liver degeneration. It would seem probable that T.N.T. may act as an irritant in the stomach or intestines, as it may in the skin, independently of internal toxic effects.

3. *Blood Changes.*

These appear to be the same in kind as, though less in degree than, those mentioned already for D.N.B. The presence of methæmoglobin may be demonstrated commonly in the blood of workers, though cyanosis and breathlessness are much less evident than in the case of D.N.B. poisoning. Further investigations upon the precise changes in blood are in progress. There seems little reason to doubt that those already recognised are due to a direct action of T.N.T. introduced to the blood as such by absorption from the skin or from mucous surfaces.

4. *Liver Degeneration, "Toxic Jaundice."*

While the blood changes due to T.N.T. absorption are less noticeable than with D.N.B., T.N.T. appears to produce cell degeneration more readily, with the resulting toxic jaundice when the liver is involved. Even with T.N.T., however, only a small minority of persons under present conditions of work have shown signs of toxic jaundice, and the fatal cases have been few in relation to the great numbers of workers engaged.

Upon the comparison already made between the toxic effects of D.N.B. with those of T.N.T. it may be suggested that the very prominence of blood changes due to the former diminishes, by the attention it arouses, the chance of grave poisoning of the liver, and that in the case of T.N.T. the comparatively small note of warning given beforehand allows toxic jaundice to supervene in a certain number of workers who are not withdrawn in time.

The actual signs and symptoms in particular cases will be varying combinations of those in these groups.

Physical Signs.

Evidence of gradual absorption is shown by pallor of the face and an ashen-grey colour of the lips, tending to

disappear it the worker becomes excited, as by medical examination. Sometimes the lips and tongue are deeply cyanosed. The tongue is generally free from fur. Abdominal distension is usually pronounced.

Jaundice may be conjunctival or general, and often appears suddenly without preliminary warning, rarely before the fourth week of employment. The liver dullness then is variable and no prognosis can be based on it, but it has been known to diminish rapidly towards the termination of a fatal case. The liver area may be tender. Ascites is present in a few cases. Respiratory distress is not noticeable when the patient lies in bed. Pyrexia has occasionally been observed in severe cases, which have eventually recovered. Neither bradycardia nor pruritus is common. Bile is present in the urine—occasionally albuminuria and intermittent glycosuria. In fatal cases coma and delirium supervene suddenly, usually about three weeks after the first appearance of jaundice.

Two deaths have occurred among T.N.T. workers from profound anæmia (unassociated with jaundice) with reduction of the red blood cells to one million per cubic millimetre. Examination of blood films showed the cells of unequal size, but there were no irregular shapes, poikilocytes, or nucleated red blood cells. Microscopical examination excluded pernicious anæmia. The symptoms in one case began with an attack resembling influenza, followed by bleeding from the nose and mouth, petechiæ on face, arms, and neck, and swollen gums. In this case the characteristic atrophy of the liver was found post mortem. In the other there was no evidence in the body of the lesions which are associated with hepatic insufficiency. Death resulted from a hæmolytic aplastic anæmia, the amount of the blood-forming marrow having been greatly reduced.

Dermatitis.

Localised rashes, especially where there is pressure or friction, as from bands or ill-fitting clothes, are common. The parts most frequently affected are the hands, wrists, face (particularly round the eyes and chin), the neck, and the feet. On the hands the rash is most frequently of the cheiropompholyx type; sometimes it takes the form of discrete red patches on the backs of the hands and wrists, and on the face and neck usually as a superficial erythema attended with swelling. In whatever form it appears pruritus is intense. Fine desquamation usually follows. In a few cases the skin is exfoliated in large flakes. The character of the rash is frequently altered by a secondary infection through scratching.

Speaking generally, the skin affections due to T.N.T. are not of a severe character and yield readily to the usual treatment for eczema. To allay the itching small doses of quinine have been found useful.

Differential Diagnosis.

So-called T.N.T. poisoning is apt to be confused with gastric disturbance set up by other causes. The history given by a patient is very often misleading. Many of the workers have no idea as to the nature of the substance upon which they are working, and refer to all explosive powders as T.N.T. The staining of the hands is very little guide, as this condition is met with from C.E. (tetryl or tetranitromethylanilin) and lyddite (picric acid or trinitrophenol).[1]

The following points are of importance for the diagnosis of T.N.T. poisoning:—

1. The characteristic appearance as previously described.
2. The character and situation of the abdominal pain.
3. The presence of constipation and abdominal distension.

Post-mortem Examination.

The outstanding feature is the atrophy of the liver, which in acute cases is reduced to one-half the normal weight. The outer surface is smooth, reddish in colour, with slightly elevated gamboge-coloured areas of various sizes. On section in the red areas the tissue is smooth, flat, and firm; the normal lobular pattern is absent, the portal systems being set very close to one another; in the elevated yellow islands the tissue is bulged and soft; an indistinct lobulation is visible, the lobules being larger than normally. Ascites is sometimes present. The bile in the gall-bladder may be unusually viscid. The kidneys on section are enlarged and icteric; the cortex bulges and the labyrinths are frequently conspicuously yellow. There is considerable engorgement of the pyramids.

The myocardium is pale, soft, and flabby. Petechial and diffuse hæmorrhages are generally found beneath the endocardium, the pericardium, and the peritoneum. They have been observed on the skin, on the rib cartilages, and elsewhere in the body.

Microscopical Appearance of the Liver and Kidneys.

Microscopically a great part of the liver tissue is found to have undergone complete destruction associated with a proliferation of fibrous tissue. In these areas the necrosed hepatic cells have almost entirely disappeared. The areas of complete destruction correspond to the sunken red areas seen with the naked eye. Where the destruction is not complete the histological picture is almost identical with that of the early stages of ordinary portal fibrosis. The liver tissue is traversed by fibrous trabeculæ enclosing areas of degenerate, partly destroyed parenchyma; in the healthier parenchyma slight regeneration may be present. These areas of incomplete destruction correspond to the raised gamboge-coloured nodules seen with the naked eye. The kidneys show cloudy swelling and fatty degeneration in the tubules.

The jaundice is possibly the result of obstruction, because in sections of the raised areas the bile-dilated intercellular spaces have been found to be confined to the central portions of the lobules, whilst the portal bile-ducts have shown catarrhal degeneration and the portal ductules narrowing or obliteration of their lumina.

Predisposition.

Case incidence and proportion of deaths from toxic jaundice to attacks is little affected by sex. Thirty-three per cent. of recognised and notified cases have proved fatal. The fatality under 18 years of age is striking—eight deaths out of eleven reported attacked. Duration of employment before appearance of jaundice shows remarkable uniformity, at least 83 per cent. of the cases occurring between the fifth and the sixteenth week. In 105 reports on toxic jaundice not one had been employed for a period less than four weeks. Only two fatal cases have been reported where duration of employment had been more than four months, although thousands of workers have worked a much longer time. It would almost appear as though workers could be divided into two classes—the one (and much the larger) insusceptible and remaining so, however much exposed; the other susceptible and liable to succumb, especially between the fifth and fifteenth week. Although there has undoubtedly been some association between unfavourable industrial conditions and the occurrence of cases, fatal poisoning has sometimes occurred where exposure to dust and fumes at any rate appeared to be quite excluded, as, for example, in trolley work outside the building. In one remarkable case the fatal jaundice developed seven weeks after entire cessation from employment, the deceased having apparently been well during the interval. Long delay in onset of symptoms, such as is shown in this case, suggests that T.N.T. is gradually absorbed from some part of the body in which it is temporarily stored.

Channels of Absorption.

The problem of determining the chief path by which T.N.T. enters the body has been worked out in a T.N.T. factory. The T.N.T. test referred to was used in the belief that it afforded evidence of elimination after absorption, and as a sign, therefore, of the unavoidable effect of exposure merely, rather than of poisoning. Probably T.N.T., after it enters, can be eliminated from the body harmlessly in the combined form in which it occurs in the urine. Examining the urine of T.N.T. workers daily for a period of seven weeks, the conclusion come to was that where there is absorption from the skin in susceptible persons the test shows a deeper colour reaction than in absorption from the digestive tract, and this reaction is found to persist for days

[1] The effects of tetryl and picric acid are both liable to be mistaken for T.N.T., and may, in consequence, lead to erroneous notification of toxic jaundice. Both stain the exposed skin—tetryl a yellow to an apricot colour, picric acid a canary yellow or greenish-yellow. They both set up an acute dermatitis, tetryl affecting chiefly the conjunctivæ, the alæ nasi, the sides of the neck, the chin, and, less frequently, the hands; and picric acid the hands and forearms chiefly, very much like T.N.T. Constitutional symptoms from both are slight in comparison with those from T.N.T. No case of toxic jaundice from either has so far been reported, although thousands of workers come in contact with them. Apart from the initial dermatitis (which few handling the substance escape), symptoms of gastric unrest and breathlessness with diffused heart pulsation have been noted from tetryl.

after removal from exposure. On the other hand, the urine reaction following on ingestion of T.N T. disappears in less than 24 hours. Absorption through the mouth and by breathing is probably only of less importance because when once work is over these paths of entry are no longer exposed to T.N.T., and the amount absorbed, which is less than that gaining access to the skin, is eliminated before work recommences.

Preventive Measures.

In the manufacture and use of dinitrobenzene before the war need for minimising the dose was well recognised either by arranging for alternation of employment or by allowing the workers such time off as was necessary for their recovery. Experience had shown that long hours of continuous work were impracticable. Similarly in some large factories where the number of workers and the nature of the processes carried on has permitted of systematic alternation of work on T.N.T. with other work away from it, no cases of toxic jaundice have been reported. And in others where on occurrence of cases alternation has been arranged the number notified has fallen. Hence, in considering remedial measures against the danger of T.N.T. in circumstances demanding the utmost output, the aim is, apart from removal of fumes and dust, to employ workers over 18 years of age, to make suitable canteen provision, so that workers can obtain good food on factory premises, to eliminate those showing early signs by frequent medical examination, and to alternate the work or reduce the length of the shift if practicable. Complete protection of the skin is very difficult of attainment, but investigation is being made as to whether this may not perhaps be overcome in another way by the use of solvents such as have been mentioned (benzol, xylol, &c.).

The prophylactic measures adopted, for example, in the Royal Arsenal are as follows:

1. Only persons in good health, and as far as practicable between the ages of 20 and 50, are employed on T.N.T.
2. All workers are inspected by a medical officer once a week.
3. Special clothing is provided, also veils, respirators, and gauntletted gloves.
4. Employment is alternated fortnightly.
5. Adequate ventilation in workshops is arranged for.
6. Mechanical devices are adopted for preventing dust and getting rid of fumes.
7. Workers are warned against sleeping in the clothing worn at the factory, and advised to have a complete change of clothing on reaching home.
8. Facilities are provided for obtaining suitable and sufficient food at proper intervals. Milk is supplied free on the arrival of the workers.
9. Washing of hands and face is insisted upon before meals, and before leaving the factory. Neutral soap and individual towels are provided.

Treatment.

Where jaundice is absent the treatment is simple and satisfactory. The following is the usual procedure adopted at the Royal Arsenal: Removal from contact—rest in bed for a day or two. Diet: Milk, milk puddings, fruit and green vegetables; demulcent drinks, such as barley water, the imperial drink tea and coffee. For the persistent constipation vegetable laxatives and cascara sagrada are employed. A mixture containing sodium sulphate, potassium citrate, and sodium bicarbonate is given as a routine measure.

In the treatment of cases with jaundice absolute rest in bed from the first is essential; milk at first in small quantities, slowly increasing the quantity given to four pints a day. The bowels must be kept loose, preferably by mist. alba repeatedly given to maintain its action if necessary.

In cases of jaundice the prognosis is always grave. Alkali-producing drugs, such as citrates and bicarbonates, are given to counteract the tendency to acid intoxication. Rectal and intravenous saline injections have a definite place in the treatment of severe cases.

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ADDENDUM ON A URINARY TEST FOR T.N.T. ILLNESS AND THE EARLY DIAGNOSIS OF CASES SUFFERING FROM T.N.T. ABSORPTION.

It has hitherto been a difficult matter to follow up T.N.T. after it has once entered into the system. The reason is that T.N.T., like many other toxic substances, becomes combined in the body in a reaction which changes it for the time being, and probably renders it less poisonous. Once it has passed into the system and been so dealt with, it is no longer taken up by its well-known solvents, and must be set free again before it can be recognised by chemical tests.

Thus, a sample of urine from a T.N.T. worker loaded up with the altered T.N.T. can be extracted with a T.N.T. solvent, and yet not a trace be discoverable in the extractive. If, however, the substance be first set free with acid, and then extracted with an appropriate solvent, the characteristic reactions of T.N.T. can be obtained from the solution in the extractive.

A considerable experience in testing many hundreds of urinary samples from T.N.T. operatives has led to the following precise way of carrying out the test.

Webster's Test for Presence of T.N.T. in Urine.

Measure out 12½ c.cm. of the urine in a measuring cylinder, then add 12½ c.cm. of diluted sulphuric acid, made up by mixing 20 c.cm. of strong sulphuric acid with 80 c.cm. of water. Pour the mixture of urine and acid into a separating funnel of 100 to 150 c.cm. capacity and provided with a stopcock—add to the mixture 10 c.cm. of ethylic ether (the ordinary ether made from methylated spirit is sufficiently pure for the purpose), shake up well and allow to settle, take out the cork or stopper from the top of the separating funnel, open the stopcock at the bottom and allow the mixture of acid and urine to run off, then turn the stopcock off so as to retain the ethereal solution in the separating funnel. Now add 25 c.cm. of tap water to the ethereal solution in the separating funnel and shake up again to remove the traces of the mixture of urine and acid and allow to settle again for two or three minutes, then run off the water by opening the stopcock, retaining the ether in the funnel. Finally, let the ethereal solution flow into an ordinary test-tube and try for the presence of T.N.T. in it as follows.

Prepare a solution of alcoholic potash by dissolving 4 to 5 grammes of caustic potash in 100 c.cm. of methylated spirit or absolute alchol. Where many tests are to be carried out this solution may be made by having a stock saturated solution of caustic potash, and adding, when a fresh quantity of the reagent is required, 10 c.cm. of this to 90 c.cm. of alcohol.

To the ethereal solution obtained as above described 5 c.cm. of this alcoholic solution of potash are added. When T.N.T. is present a purple colouration is at once developed, varying in intensity according to the amount of T.N.T. present, from the faintest trace to a deep purple. The colour changes rapidly from the purple to a brown colour, and it has been found that the best results as to intensity are obtained by judging rapidly after the colour is struck.

It is easy for each observer to develop, after a little experience in using the test daily, an arbitrary scale of intensity which will enable him to judge degrees and follow relative intensities in the urine, and thus the effect of measures such as cleansing the patient's clothing and person and removal from contact with T.N.T.

In elaborating the test a scale represented by *trace*, *1*, *2*, *3*, *4*, and *intense* has been used. At present it is impossible to construct a better scale, as the colours of comparative solutions of known strength of T.N.T. vary so rapidly, and as the substance isolated from the urine does not behave exactly like T.N.T. Also bodies present in the urine and reagents vary the intensity of colour and speed of fading out. However, in the manner described above a fairly good rough standard of intensity can be obtained serviceable for clinical work and experimental observation.

A little experience enables the observer to carry out the test quite rapidly, and a single test can be made when all is ready in four or five minutes. Where a large number of tests have to be made daily, the chief loss of time is occasioned by waiting for the layer of ether to separate at the top of the mixture. This can be obviated by employing a battery of about eight separating funnels and carrying on from one sample to another while the settlement takes place. The eight ethereal extracts after treatment as above described are run off into eight test-tubes of equal diameter. Another eight test-tubes have previously had marked off upon them roughly about 5 c.cm., and have been filled to this mark with the alcoholic potash, and this is now poured off from each of these latter test-tubes into the ethereal extracts, and the results noted down. Working in this way, 20 to 30 tests may be made in an hour, and comparative results so obtained possess an enhanced value over separate tests until the observer has become well accustomed to making the test.

The test is not a difficult one to perform, and when efficiently carried out demonstrates in nearly all cases of T.N.T. workers the presence of T.N.T. passing through the system, but in very varying degree. Some show scarcely any absorption, others give an intense reaction.

Interpretation.

The judgment on the test and its applications clinically must not be made solely on the intensity of the test. There are many workers on T.N.T. whose urine will give the test intensely at night after working during the day, and before going back to the next shift of work the urine may be quite or almost clear. These are not the persons who are in any immediate danger. The real value of the test is twofold—first, in clinching a doubtful diagnosis on clinical symptoms (previous to the appearance of toxic jaundice); and secondly, in watching the clearance of T.N.T. from the system after isolation from T.N.T., and judging whether isolation and other precautionary measures have been effective.

When there is doubt as to the presence of the early diagnostic symptoms, then the test should be made, and if it gives a fairly high result the patient should at once be taken off work on T.N.T. and the urinary test made if possible daily in the succeeding two or three days.

If the urine clears up within 24 hours, and clinical symptoms confirm this improvement, the case may be either one of the less harmful ones of absorption by swallowing, or not really a case of T.N.T. illness. If, on the other hand, the urinary reaction after removal from work and separation from soiled clothing persists for three or four days, it is almost certain that the case is one of the more serious ones of a susceptible skin, and such a person ought to be permanently removed from T.N.T. work.

In all cases of applying the test, but more particularly in the case of persons removed from work as suffering from T.N.T., care should be taken to judge between accidental contamination of the sample of urine by T.N.T. and T.N.T. which has actually passed through the body. Fortunately this distinction is easily made, because of the way in which the system binds up the T.N.T. Where contamination is suspected, and it is fairly frequent, it may at once be detected by omitting the acid in the above test, and extracting the urine with ether either undiluted or after dilution with an equal volume of water instead of the acid.

When a positive result is obtained without acid it may be set down to contamination from clothing, skin, or hair in the act of passing the urine. The detection of this contamination is in itself valuable, as it shows that the patient has not carried out instructions, and while supposed to be free from contact with T.N.T. is still exposed to it.

Even in such a contaminated urine the degree to which T.N.T. is continuing to be absorbed can still be accurately followed up. All that it is necessary to do is to shake up the urine, *without the addition of acid*, with ether as described above, when the test in this quantity of ether shows the degree of contamination. This unacidified urine, now free from T.N.T. *due to contamination*, can next be utilised for carrying out the test as to how much is passing through the system.

THE CONTROL OF VENEREAL DISEASES.

Women and Compulsory Notification.

A GROUP of women, influential in different walks of life, recently called upon the Government to institute compulsory notification of venereal diseases as a necessary preliminary to any efficient scheme of dealing with them. We have now received a manifesto in precisely opposite sense, to which a number of well-known women have attached their signature. A women's deputation to the Home Secretary on Dec. 4th, organised by the Women's Freedom League, stated their objection to compulsory notification, compulsory treatment, as well as to the compulsory detention of infective persons in prisons and Poor-law institutions; wilful transmission of disease was, on the other hand, urged by the deputation as an occasion for criminal proceedings. The detention of Poor-law patients was recently approved at the annual meeting of the Association of Poor Law Unions, but the arguments against compulsory notification are well recognised by the medical profession, who are in general accord with the findings of the Royal Commission as to the dangers of compulsion at this stage of the scheme.

County Council Schemes.

Reports are to hand from all parts of the country recording progress made in framing schemes of control. The Newcastle-on-Tyne conference already noted resulted in an agreement to institute treatment centres at Ashington (New Hosp.), Blyth (Knight Memorial Hosp.), Darlington (Hosp. and Disp.), Durham (County Hosp.), Hartlepools (Hosp. and Cameron Hosp.), Newcastle (Royal Infirm.), South Shields (Ingham Infirm.), Stockton and Thornaby (Hosp.), and Sunderland (Royal Infirm.). Westmorland proposes to send patients for special treatment to the Manchester Royal Infirmary, the Local Government Board having authorised the payment by the county council of the railway fares of necessitous patients. The West Riding of Yorkshire proposes treatment centres for the present at Bradford, Leeds, and Sheffield. The Norfolk and Norwich Hospital is to serve the needs of Great Yarmouth, as well as of the city and county. Worcestershire, Leicestershire, Cambridgeshire, and East and West Sussex are also coming forward with schemes.

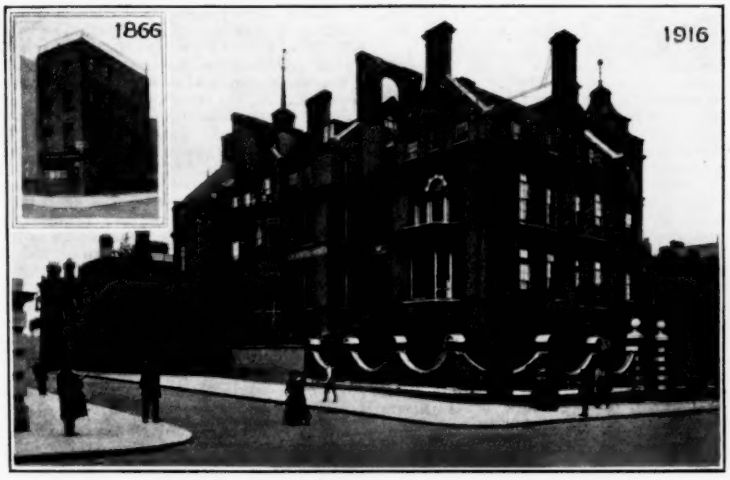
The London Hospital.

The London Hospital has allotted 15 beds for syphilis, each in a separate room. Four sessions a week will be held in the genito-urinary department, two each for men and women, and in the case of the former attendance is extended to 7 P.M. The hospital is appointing three additional clinical assistants, the number to be further increased by the appointment of local general practitioners.

A FOOD AND DRUGS ACT FOR INDIA.—The Government of India some time ago consulted the local governments on the subject of legislation to prevent the adulteration of food and drugs. The replies received, though not unanimous as to the form which legislation should take, entirely agree on the desirability of further legislation. The adulteration of foodstuffs is widely prevalent throughout India, while the existing law is inadequate to cope with the evil. The Government are, however, averse from passing an All-India Act to check the evil, as such an Act, if it took the form of a mere skeleton or enabling Act, would still leave all real legislation in the hands of the provincial governments. If, on the other hand, the Act descended into details it would require frequent amendment to meet local needs. The Government of India have, therefore, decided that measures shall be taken by the local legislatures, and a circular letter has been addressed to all of these (except that of the United Provinces, which already have a Prevention of Adulteration Act), suggesting the lines on which reform shall be based. In several particulars the Act already in force in the United Provinces is followed. The adulteration of drugs is left for the present to be dealt with under the Indian Penal Code.

THE NEW HOSPITAL FOR WOMEN: JUBILEE CELEBRATION.

THE New Hospital for Women, which celebrates its fiftieth anniversary this week, had its beginning in the St. Mary's Dispensary for Women and Children, which was opened at 72, Seymour-place, London, W., in 1866. Here Elizabeth Garrett (later Mrs. Garrett Anderson), who had obtained a licence from the Society of Apothecaries, took medical charge and remained sole visiting physician until 1870, when she was joined by another lady, Miss Morgan, a medical graduate of the University of Zürich. Up to the end of 1871 over 9000 new patients were treated at the dispensary and numbers of maternity and urgent medical cases at their own homes. In February, 1872, a small hospital of 10 beds was opened over the dispensary and took the name of New Hospital for Women. In 1875 house property was secured in Marylebone-road, whereby accommodation was increased to 26 beds, and by the end of 1888 more than 3000 in-patients and 35,000 out-patients had been received. At that time Mary D. Scharlieb, a medical graduate of London University, Julia Cock, and Jane Walker, both with the licence of the Royal College of Physicians of Ireland, became members of the medical staff. The site of the present hospital in Euston-road was obtained through the energy of Rev. Llewelyn Davies, the chairman of the hospital. The foundation-stone was laid by the Princess of Wales in 1889 and the hospital opened in 1890 with 40 beds. With the completion of the new wing in 1911 the number of beds reached a total of 71. To relieve pressure on the beds an annexe in the country was then projected and the Rosa Morison House was opened with 20 beds at New Barnet in 1913 as a house of recovery, to which in-patients could be removed as soon as practicable after operation and acute illness.



The New Hospital for Women in 1916.
Inset: St. Mary's Dispensary for Women and Children in 1866.

In the absence of Lady Hall, honorary treasurer of the hospital, Lady Minto presided at the meeting on Tuesday afternoon last to celebrate the jubilee. Queen Alexandra sent a sympathetic message and Queen Amelie of Portugal was present. Sir Alfred Keogh, in an address, spoke of the successful vanquishing by women of the difficulties besetting their entrance into the career of medicine. One of the most notable results of the present war would be the assuring to women of their proper position in medicine and surgery. As far as he knew, women made quite as good physicians and surgeons as men. He went on to deplore the necessity of further hospital accommodation, expressing the hope that the study of sanitation promoted by the war would result in an increase of preventive medicine sufficient to empty some of the existing hospitals. Mrs. Scharlieb paid a warm tribute to the great work done for the hospital by Mrs. Garrett Anderson, and congratulated the hospital on having supplied medical women to all parts of the war area. Sir John Bland-Sutton stated that novelty was not sufficient to attract hospital patients, who were, as a class, peculiarly discriminating. A full hospital with a long waiting list testified to the good work done. He had several times analysed the results of gynæcological operations at the New Hospital for Women and found them equal to those of any large London hospital. He held that all the hospitals in London should be open to women on the same terms as to men. Dr. Louisa G. Anderson spoke of her mother's belief that the existence of the New Hospital for Women was essential in order to gain for women the highest place in the medical profession.

The jubilee celebration is associated with an appeal for funds to endow fully 50 at least of the existing hospital beds. Communications should be addressed to Lady Hall, honorary treasurer, Jubilee Appeal Fund, New Hospital for Women, Euston-road, London, N.W.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

To be temporary Surgeons: W. O. Sankey, G. S. Sowden, J. E. Clark, and F. Ewart.

ARMY MEDICAL SERVICE.

Temp. Cols. (Lieut.-Cols., R.A.M.C., T.F.) Sir James K. Fowler, K.C.V.O., and F. F. Burghard, C.B., having resigned their appointments relinquish their temporary commissions.

TERRITORIAL FORCE.

Capt. D. J. Scott, London Field Ambulance, to be Deputy Assistant Director of Medical Services, 56th Division.

ROYAL ARMY MEDICAL CORPS.

Lieut.-Col. (temp. Col.) Joseph F. M. Kelly relinquishes his temporary rank on re-posting.

Lieut.-Col. Robert S. H. Fuhr, D.S.O., to be temporary Colonel whilst employed as an Assistant Director of Medical Services of a Division.

The undermentioned Majors to be temporary Lieutenant-Colonels whilst in command of a Stationary Hospital:—E. B. Knox, H. L. W. Norrington, D.S.O., and L. W. Harrison, D.S.O.

Major Vincent J. Crawford, D.S.O., to be temporary Lieutenant-Colonel whilst in command of a Field Ambulance.

Temp. Major A. H. Carter to be temporary Lieutenant-Colonel.

To be temporary Majors: Temp. Capts. H. MacCormac and G. T. S. Sichel.

Temporary Lieutenants to be temporary Captains: E. A. Pywell, H. A. Hutt, E. Atkinson, F. L. Brown, E. W. L. Sharp, E. A. Shirvell, I. M. Frazer, C. J. Sparrow, D. P. Williams, T. B. Welch, J. Black, W. J. Maloney, A. C. Norman, F. R. Barwell, W. D. A. King, J. Miller, J. O. Garland, W. C. MacFetridge, R. M. L. Anderson, T. D. McLaren, E. A. Scott, S. J. Darke, F. W. Martin, T. W. N. Dunn, J. W. Bennett, E. C. E. Van-Eyck, A. D. Rope, C. W. Ensor, E. L. Massiah, J. H. Cooke, J. A. MacLean, F. B. Hawes, R. A. G. Elliott, W. L. Dibb, H. B. Moyle, H. P. Rogers, W. Barbour, M. MacKenzie, H. L. Flint, P. W. Barker, T. R. Phipps, F. A. Ross, G. T. Foster-Smith, G. Mc.I. Dale, A. R. Riddell, R. I. Harris, C. L. Emmerson, T. M. R. Waddell, G. W. P. Maitland, C. Fraser, G. Laurence, A. R. Hargreaves, J. Spears, H. B. Minshull, A. W. T. Whitworth, V. E. Ridewood, T. Russell, A. W. G. Woodforde, E. C. Moore, R. N. Watson, H. Smith, J. Cropper, A. A. Watson, A. C. Fleming, E. McIntyre, R. McRae, F. C. Lees, G. F. Porter, R. B. Hennessy, W. E. Fraser, F. A. Winder, A. Whytt, C. J. L. Patch, R. D. Lemon, W. E. Gemmell, E. W. Longden, A. Mudie, A. J. R.

Taylor, W. T. Munro, A. R. F. Douglas, J. A. Gilfillan, H. E. Robinson, H. H. L. Ellison, W. S. Williamson, S. Infield, H. B. Wilkinson, D. Clow, W. McConnell, D. C. M. Page, L. Levy, G. B. Thwaites, W. D. G. Mulloy, W. G. Galletley, A. D. Low, J. Craig, J. A. Frost, E. H. Freeman, J. Humphreys, D. W. Maclagan, J. A. Black, E. Prall, W. J. E. Stuttaford, E. P. Marett, A. Malseed, G. E. Lindsay, A. Barber, O. D. B. Mawson, G. F. Bird, C. H. Edwards, D. McM. Dickson, R. Anderson, R. H. Shepard, and L. T. Giles.

To be Temporary Captains: H. Mundy (S. African M.C.), T. E. Hincks (late Captain, S. Wales Borderers) (T.F.), W. Parry-Morgan, and L. A. B. Grier, C.A.M.C.

To be Temporary Lieutenants: J. M. Coplans, T. P. Linehan, J. S. Daniell, Temp. Hon. Lieut. H. C. Shockett, J. Laing, J. B. McEwan, L. G. White, H. F. Devis, P. R. McNaught, T. W. Jones, J. Cruickshank, W. Montgomery, P. J. Holmes, T. B. Smith, R. C. de Courcy Wheeler, S. F. Floyd, H. M. Grey, T. S. S. Holmes, J. G. Copland, L. F. Lovell-Keays, J. Chambre, J. A. C. Greene, J. M. Inverarity, J. Pryce-Davies, M. Golding, W. Thomson, G. H. Morris, R. H. Rains, P. McL. Shiels, H. D. Wilson, Temp. Hon. Lieut. W. Simpson, J. E. Murray, Lt. S. H. Glanville, V. C. Montgomery, A. H. Macklin, G. H. Jones, W. D. Kirkwood, and G. T. Birks.

To be Temporary Honorary Lieutenant: R. A. Chisholm, whilst employed with No. 8 British Red Cross (Baltic and Corn Exchange) Hospital.

Temporary Captains relinquishing their commissions:—A. D. Vardon, W. R. MacKenzie, H. C. Highet, J. C. R. Braine-Hartnell, C. J. Kelly, R. Williams, D. Welsh, and J. Braithwaite, K. N. MacLean, and W. E. Bracey (on account of ill-health).

Temporary Lieutenants relinquishing their commissions: L. T. Griffiths, H. T. Marrable, H. W. Nott, R. C. Muir, W. G. Parkinson, J. G. Sharp, J. Bradley-Hughes, H. W. B. Ruxton, E. A. Hutton-Attenborough, D. Anderson, R. G. Chase, T. J. Taunton, H. R. Irvine, J. Logan, P. Kinmont, R. T. Forster, H. E. Barnes, F. W. Hobbs, W. H. Lamplough, G. A. Gordon, J. L. M. Smith, J. Moffat, C. W. W. James, B. W. Jones, O. G. Donovan, J. W. Fox, S. V. Robinson, M. Anthony, W. Roche, H. C. Heathcote, C. A. Hughes, R. L. Keown, A. T. M. Blair, J. D. Curtis, L. H. Douglass, C. R. Totton, H. M. D. Townsend, J. H. Nixon, H. H. Fairfax, H. Holt, H. O'Neill, E. F. Buckler, G. H. H. Almond, F. C. Carlé, H. C. Miller, R. Kenyon, L. J. Hood, C. H. G. Gostwyck, T. E. Dobbs, and M. Davies.

SPECIAL RESERVE OF OFFICERS.

To be Lieutenants: H. Morley, R. F. Jarrett, J. W. G. Steell, A. W. B. Davies, and C. Young (from University of London Contingent, O.T.C.), A. R. Balmain, Second Lieut. Arthur Rodd (from Unattached List, T.F., O.T.C.), E. Newton, J. S. White, A. Duguid, B. H. Simon (from Edinburgh University Contingent, O.T.C.), and G. S. Lawrence (from Aberdeen University Contingent, O.T.C.)

TERRITORIAL FORCE.

London Field Ambulance: Capt. F. V. Denne relinquishes his commission on account of ill-health.

Home Counties Field Ambulance: Capt. B. R. Billings resigns his commission.

Home Counties Casualty Clearing Station: Lieut. W. Burt to be Captain.

London General Hospital: Major F. F. Burghard, C.B., is restored to the establishment.

East Lancashire Field Ambulance: Lieut. J. Young to be Captain.

West Lancashire Field Ambulance: Capt. R. Starkey-Smith to be Major.

Attached to Units other than Medical Units.—Lieut. John R. Bulman and G. H. Gill to be Captains. K. Atkin to be Lieutenant.

TERRITORIAL DECORATION.

The King has conferred the Territorial Decoration upon the following officers holding the rank of Major: Majors W. E. Miles, J. Wilson (attached Royal Engineers), temp. Lieut.-Col. H. A. Rudyard, W. Lewis Martin (attached Royal Scots), C. R. Bishop (attached Somerset Light Infantry), A. H. Vernon (attached Hampshire Regiment), and T. W. Banks (attached Highland Light Infantry).

INDIAN MEDICAL SERVICE.

The King has approved the promotion of the following officers:—

Captains to be Majors: H. S. Matson, F. H. Stewart, A. Cameron, A. H. Proctor, R. T. Wells, I. M. Macrae, and F. B. Snettle.

The King has also approved the grant of the temporary rank of Lieutenant in the Indian Medical Service to the undermentioned: Albert Francis Winnington-da-Costa, Indra Datt Gupta, Ikram Ali Sufi, Dhanjiskaw Dordbji Mogul, Manohar Lal Bhagat, Kirpa Sundar Basu, Gopaldas Malhoutra, Manohar Lal Bhargawa, Narendra Singh Bhai, Ram Narayan Sewal, Yajaman Viswanath Ayya, Maharaj Das, Narayenrao Marntirao Chavan, Shripad Bhaskar Gothaskar, Dadabhoy Dinshaw Variava, Kharg Bahadur Singh Karki, Frank Rodrigues, Syed Abdul Karim, Gokul Prasad Tiwari, Joy Gopal Mukharji, Gerald Secluna, Mugatlal Damodardas Munim, Ignatius Fonseca, William Austin Reardon, Prabhat Chandra Mukerji, Girdharilal Dharmdas Mehta, Royapuran Nellaveran Raja, Esardas Bulchand Gidwani, Jahangir Ratanji Wadia, Mithilesh Chandra Ghosh, Hari Pada Mukerji, Naravan Ram Chandra Summanwar, Ram Nayaran, Pennathur Krishnaswami, Nathaniel Benjamin Morris, Nadkarni Mangesh Rao, Dharm Chand Nangpaul, Terunageswaram Valaydam Pillai Rajaratnam, Nellayappa Navanitha Krishnan, Bhagwan Das Uberoi, Jotindranath Chowdhury, Ardeshir Dadabhoy Shroff, Sadasheo Gopal Paonaskar, Tirath Ram Khanna, Gurdas Ram, Shyam Behari Lal, Shridhar Atmaram Phatak, Som Butt, Suresh Chandra Mukerjee, Arunaphala Sastriar Krishnamurti, Nain Singh, Bhaskar Ramchandra Chandorkar, Darabsha Rustomji Kharas, Chandragiri Rangabhashyam, Benarsi Das, Pukazhi Raghava Warivar, Prem Nath Dogra, Munshi Ram Gupta, L. Htin Poh, Vidya Bhushan, Piyara Lal Bhal, Manekshaw Dady, Dhirendra Nath Gupta, Lal Chand Khanna, Edwin Walter Marsh, and Joseph Clement Sampson.

Capt. A. B. H. Bridges, R.A.M.C., has been appointed Surgeon to His Excellency the Commander-in-Chief in India. Major L. T. R. Hutchinson has been appointed as Presidency Surgeon, Second District in Bombay. Lieut.-Col. H. Austen Smith, surgeon to His Excellency the Viceroy, has succeeded Major L. Cotterill, R.A.M.C., as Surgeon to the Viceroy and as Honorary Secretary to the Central Committee of the Countess of Dufferin's Fund. Lieut.-Col. Timmings, port health officer, Bombay, has been promoted to Colonel and appointed Assistant Director of Medical Services, Poona, relieving Colonel Molesworth, C.I.E., who will proceed to Simla, to act as deputy director, Medical Services, Army Headquarters. Brevet-Col. F. Cleveland has been transferred from the office of Director, Medical Services, India, to act as Deputy Director-General, Indian Medical Service.

DEATHS IN THE SERVICES.

Deputy-Surgeon-General J. McElwee, R.N., at the Royal Naval Hospital, Haslar, on Dec. 9th. He qualified M.D., M.Ch., at the Royal University of Ireland in 1887, and joined the Royal Navy soon after. He saw service in the Gambia Expedition in 1891-92, and was awarded the Ashantee medal and clasp.

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.

IN the 96 English and Welsh towns with populations exceeding 50,000 persons at the last Census 7043 births and 5213 deaths were registered during the week ended Saturday, Dec. 2nd. The annual rate of mortality in these towns, which had been 13·3, 13·0, and 15·4 per 1000 in the three preceding weeks, rose to 15·7 per 1000 in the week under notice. During the first nine weeks of the current quarter the mean annual death-rate in these towns averaged 13·3, against 13·4 per 1000 in London. Among the several towns the death-rate during the week ranged from 7·6 in Lincoln, 8·3 in Wimbledon, 8·7 in Grimsby, 9·1 in West Bromwich, and 10·0 in Eastbourne and in Stockport, to 21·7 in Barnsley, 22·8 in Burnley, 24·8 in Great Yarmouth, 26·3 in Exeter, and 26·4 in Sunderland.

The 5213 deaths from all causes were 85 above the number in the previous week, and included 228 which were referred to the principal epidemic diseases, against 241 and 210 in the two preceding weeks. Of these 228 deaths, 104 resulted from infantile diarrhœal diseases, 50 from diphtheria, 47 from measles, 16 from whooping-cough, 7 from scarlet fever, and 4 from enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 0·7, against 0·6 per 1000 in the previous week. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had steadily declined from 477 to 105 in the 11 preceding weeks, numbered 104, and included 29 in London, 7 in Liverpool, 6 in Birmingham, and 4 in Newcastle-on-Tyne. The deaths referred to diphtheria, which had been 60, 56, and 45 in the three preceding weeks, rose to 50, of which 14 occurred in London and 3 each in West Ham, Liverpool, Manchester, and Sheffield. The fatal cases of measles, which had been 26, 40, and 29 in the three preceding weeks, rose to 47, and included 19 in London, 4 in Coventry, and 3 each in Liverpool, Manchester, and Oldham. The deaths attributed to whooping-cough, which had been 17, 12, and 14 in the three preceding weeks, rose to 16, and included 2 each in Birmingham, St. Helens, and Sunderland. The 7 deaths from scarlet fever, of which 2 were

registered in London, were 2 below the average in the earlier weeks of the quarter. The fatal cases of enteric fever, which had been 11 in each of the three preceding weeks, fell to 4, but showed no excess in any particular town.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had been 1171, 1170, and 1123 at the end of the three preceding weeks, further fell to 1037 in the week under notice; 120 new cases were admitted during the week, against 157, 131, and 120 in the three preceding weeks. The cases of diphtheria, which in the 11 preceding weeks had increased from 1262 to 1584, fell to 1550; 171 new cases were admitted during the week, against 202, 193, and 195 in the three preceding weeks. These hospitals also contained 127 cases of measles, 42 of enteric fever, and 39 of whooping-cough, but not one of small-pox. The 1379 deaths from all causes in London were 74 in excess of the number in the previous week, and corresponded to an annual death-rate of 16·7 per 1000. The deaths referred to diseases of the respiratory system, which had increased from 132 to 294 in the six preceding weeks, further rose to 337 in the week under notice.

Of the 5213 deaths from all causes in the 96 towns, 215 resulted from violence, 447 were the subject of coroners' inquests, and 1465 occurred in public institutions. The causes of 41, or 0·8 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in Sheffield, Leeds, West Ham, Bradford, Newcastle-on-Tyne, and in 67 other smaller towns. Of the 41 uncertified causes, 9 were registered in Liverpool, 3 each in Birmingham and St. Helens, and 2 each in Coventry, Preston, South Shields, Gateshead, and York.

In the 96 English and Welsh towns 6891 births and 5912 deaths were registered during the week ended Saturday, Dec. 9th. The annual rate of mortality, which had been 13·0, 15·4, and 15·7 per 1000 in the three preceding weeks, further rose in the week under notice to 17·8 per 1000 of their aggregate civil population estimated at 17,312,295 persons for the year 1915. During the first ten weeks of the current quarter the mean annual death-rate in these towns averaged 13·7, against 14·1 per 1000 in London. Among the several towns the death-rate last week ranged from 7·6 in Lincoln, 9·2 in Wallasey, 9·7 in Wigan, 10·2 in Wimbledon, and 11·1 in Enfield, to 23·8 in Norwich, 24·0 in Carlisle, 24·6 in Bournemouth, 24·8 in Great Yarmouth, and 33·1 in Hastings.

The 5912 deaths from all causes were 699 in excess of the number in the previous week, and included 226 which were referred to the principal epidemic diseases, against 210 and 228 in the two preceding weeks. Of these 226 deaths, 83 resulted from infantile diarrhœal diseases, 56 from measles, 47 from diphtheria, 23 from whooping-cough, 9 from enteric fever, and 8 from scarlet fever, but not one from small-pox. The annual death-rate from these diseases was equal to 0·7 per 1000, and coincided with that recorded in the previous week. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had declined from 477 to 104 in the 12 preceding weeks, further fell to 83, and included 33 in London, 6 in Liverpool, 4 each in Birmingham and Rhondda, and 3 in Sheffield. The deaths attributed to measles, which had been 40, 29, and 47 in the three preceding weeks, rose to 56, of which 25 occurred in London, 5 in Edmonton, 4 each in Coventry and Manchester, and 3 each in East Ham and Birkenhead. The fatal cases of diphtheria, which had been 56, 45, and 50 in the three preceding weeks, fell to 47, and included 16 in London and 3 in West Ham. The deaths attributed to whooping-cough, which had been 12, 14, and 16 in the three preceding weeks, further rose to 23, of which 4 were registered in London and 2 each in Bristol, Leicester, and Barnsley. The deaths referred to enteric fever, which had been 11, 11, and 4 in the three preceding weeks, rose to 9, but showed no excess in any particular town. The 8 fatal cases of scarlet fever, of which 2 occurred in Sunderland, were equal to the average in the three preceding weeks.

The number of scarlet fever patients under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, which had declined from 1171 to 1087 in the four preceding weeks, further fell to 1047 on Saturday last; 103 new cases were admitted during the week, against 131, 120, and 120 in the three preceding weeks. The cases of diphtheria numbered 1513, against 1556, 1584, and 1550 at the end of the preceding three weeks; 169 new cases were admitted, against 193, 195, and 171 in the three preceding weeks. These hospitals also contained on Saturday last 154 cases of measles, 45 of whooping-cough, and 36 of enteric fever, but not one of small-pox. The 1683 deaths from all causes in London were 304 above the number in the previous week, and corresponded to an annual death-rate of 20·4 per 1000. The deaths referred to diseases of the respiratory system, which had steadily increased from 132 to 337 in the seven preceding weeks, further rose to 400 in the week under notice. The deaths from influenza numbered 55, against 17 and 41 in the two preceding weeks.

Of the 5912 deaths from all causes in the 96 towns, 220 resulted from violence, 484 were the subject of coroners' inquests, and 1681 occurred in public institutions. The causes of 51, or 0·9 per cent., of the total deaths were not certified either by a registered medical practitioner or by a coroner after inquest. All the causes of death were duly certified in Sheffield, Leeds, Bristol, West Ham, Bradford, and in 68 other smaller towns. Of the 51 uncertified causes, 10 were registered in Birmingham, 7 in Liverpool, 4 in Bury, and 3 each in South Shields and Gateshead.

HEALTH OF SCOTCH TOWNS.

In the 16 largest Scotch towns with an aggregate population estimated at 2,372,000 persons at the middle of this year 950 births and 626 deaths were registered during the week ended Saturday, Dec. 2nd. The annual rate of mortality, which had been 14·5, 13·9, and 15·4 per 1000 in the three preceding weeks, fell to 13·8 per 1000 in the week under notice. During the first nine weeks of the current quarter the mean annual death-rate in these towns averaged 14·0, against 13·3 per 1000 in the large English towns. Among the several towns the death-rate during the week ranged from 6·2 in Motherwell, 8·0 in Clydebank, and 8·6 in Perth, to 16·0 in Hamilton, 19·4 in Dundee, and 22·2 in Leith.

The 626 deaths from all causes were 74 below the number in the previous week, and included 45 which were referred to the principal epidemic diseases, against numbers increasing from 38 to 53 in the three preceding weeks. Of these 45 deaths, 16 resulted from measles, 10 from infantile diarrhœal diseases, 9 from diphtheria, 6 from whooping-cough, and 4 from scarlet fever, but not one from small-pox or from enteric fever. The annual death-rate from these diseases was equal to 1·0, against 0·7 per 1000 in the large English towns. The deaths attributed to measles, which had been 8, 9, and 20 in the three preceding weeks, fell to 16, and comprised 11 in Dundee, 4 in Glasgow, and 1 in Edinburgh. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had been 13, 18, and 18 in the three preceding weeks, fell to 10, and included 4 in Glasgow and 3 in Dundee. The fatal cases of diphtheria, which had been 5, 8, and 9 in the three preceding weeks, were again 9 in the week under notice, and included 2 each in Glasgow and Dundee. The 6 deaths attributed to whooping-cough, of which 4 occurred in Glasgow, were 3 in excess of the average in the earlier weeks of the quarter. The 4 deaths from scarlet fever were slightly below the average in recent weeks, and included 2 in Glasgow.

The deaths referred to diseases of the respiratory system, which had increased from 74 to 131 in the six preceding weeks, fell to 118 in the week under notice, and were 173 below the number registered in the corresponding week of last year. The deaths from violence numbered 26, against 38 and 27 in the two preceding weeks.

In the 16 largest Scotch towns 971 births and 747 deaths were registered during the week ended Saturday, Dec. 9th. The annual rate of mortality, which had been 13·9, 15·4, and 13·8 per 1000 in the three preceding weeks, rose to 16·4 per 1000 in the week under notice. During the first ten weeks of the current quarter the mean annual death-rate in these towns averaged 14·3, against a corresponding rate of 13·7 per 1000 in the large English towns. Among the several towns the death-rate during the week ranged from 8·9 in Kirkcaldy, 9·2 in Coatbridge, and 11·1 in Motherwell, to 18·7 in Perth, 21·0 in Kilmarnock, and 21·4 in Dundee.

The 747 deaths from all causes were 121 in excess of the number in the previous week, and included 38 which were referred to the principal epidemic diseases, against 53 and 45 in the two preceding weeks. Of these 38 deaths, 14 resulted from infantile diarrhœal diseases, 12 from measles, 6 from diphtheria, 3 from whooping-cough, 2 from scarlet fever, and 1 from enteric fever, but not one from small-pox. The annual death-rate from these diseases was equal to 0·8, against a corresponding rate of 0·7 per 1000 in the large English towns. The deaths of infants (under 2 years) from diarrhœa and enteritis, which had been 18, 18, and 10 in the three preceding weeks, rose to 14, and included 5 in Glasgow, 3 in Edinburgh, and 2 in Dundee. The deaths referred to measles, which had been 9, 20, and 16 in the three preceding weeks, fell to 12, and comprised 8 in Dundee and 4 in Glasgow. The fatal cases of diphtheria, which had been 8, 9, and 9 in the three preceding weeks, fell to 6, but showed no excess in any particular town. The deaths attributed to whooping-cough, which had been 5, 1, and 6 in the three preceding weeks, fell to 3, and were recorded in Glasgow, Coatbridge, and Kilmarnock respectively. The fatal cases of scarlet fever occurred in Glasgow and Hamilton, and that of enteric fever in Dundee.

The deaths referred to diseases of the respiratory system, which had been 118, 131, and 118 in the three preceding

weeks, rose to 155 in the week under notice, but were 56 below the number registered in the corresponding week of last year. The deaths from violence numbered 26, against 27 and 26 in the two preceding weeks.

HEALTH OF IRISH TOWNS.

In the registration area of Dublin 206 births and 135 deaths were registered during the week ended Saturday, Dec. 2nd. The annual rate of mortality, which had been 21·3, 17·7, and 20·1 per 1000 in the three preceding weeks, fell to 17·7 in the week under notice, against corresponding rates of 16·7 and 14·3 per 1000 in London and Glasgow respectively.

The 135 deaths at all ages included 30 of infants under 1 year and 42 of persons aged 65 years and upwards. Four deaths (of infants under 2 years) were referred to diarrhœal diseases, 2 to enteric fever, and 1 to measles. The causes of 3 deaths were uncertified, and 1 other was the subject of a coroner's inquest, while 45, or 33 per cent., of the total deaths occurred in public institutions.

During the same period 163 births and 126 deaths were registered in the city of Belfast. The deaths corresponded to an annual rate of 16·8, or 1·0 per 1000 above that recorded in the previous week, and included 10 of infants under 1 year and 30 of persons aged 65 years and upwards. One death each was referred to enteric fever, measles, whooping-cough, diphtheria, and infantile diarrhœa. The causes of 3 deaths were uncertified, 4 inquests were held, and 41 of the total deaths occurred in public institutions.

In the registration area of Dublin 139 births and 156 deaths were registered during the week ended Saturday, Dec. 9th. The annual rate of mortality, which had been 17·7, 20·1, and 17·7 per 1000 in the three preceding weeks, rose to 20·5 in the week under notice, against corresponding rates of 20·4 and 16·5 per 1000 in London and Glasgow respectively.

The 156 deaths at all ages included 30 of infants under 1 year and 51 of persons aged 65 years and upwards. Three deaths (of infants under 2 years) were referred to diarrhœal diseases, and 1 each to measles, scarlet fever, and diphtheria. The causes of 9 deaths were uncertified, and those of 5 others were the subject of coroners' inquests, while 68, or 44 per cent., of the total deaths occurred in public institutions.

During the same period 148 births and 112 deaths were registered in the City of Belfast. The deaths corresponded to an annual rate of 15·0, or 1·8 per 1000 lower than that recorded in the previous week, and included 18 of infants under 1 year and 26 of persons aged 65 years and upwards. Two deaths were referred to infantile diarrhœa and 1 each to measles and diphtheria. The causes of 2 deaths were uncertified, and those of 11 others were the subject of coroners' inquests, while 31 of the total deaths occurred in public institutions.

EXEMPTION OF AN UNREGISTERED DENTIST.—An application by an unregistered dentist for exemption on the grounds of national interest and serious hardship was recently heard by the Central Appeal Tribunal. The man claimed to be the only practical dentist in the district and stated that no registered dentists were in residence there. The Central Tribunal granted him exemption conditionally on his remaining in his present occupation, basing their decision on the ground that as the man had a substantial practice of good repute, and as in the absence of other dentists, registered or unregistered, the loss of his services would be seriously detrimental to the health of the community, it was expedient in the national interest that he should continue to be engaged in his civil employment.

THE LATE DR. GEORGE ALBERT TURNER.—Dr. G. A. Turner, late medical officer to the Witwatersrand Native Labour Association, died recently at Johannesburg, in his forty-second year, from heart failure following malarial fever. He was the son of the late Sir George Turner, the distinguished authority on tropical hygiene who, it will be remembered, fell a victim to leprosy contracted in the course of his work. Dr. Turner received his medical education at Aberdeen University, where he graduated M.B., Ch.B., in 1897, obtaining the D.P.H. in the following year. Subsequently he went to South Africa, and was appointed medical officer to the Grahamstown Lunatic Asylum. After serving in the Boer War, he was engaged in public health work at Cape Town and at Kimberley until he received his appointment with the Witwatersrand Native Labour Association in 1905. In 1908 he obtained the Craig scholarship of the London School of Medicine for a monograph on the Intestinal Parasites of South African natives. The body was interred on Oct. 29th in Brixton Cemetery, where a large number of friends and official representatives gathered to pay their last respects to one who, like his father, died as a consequence of devotion to his profession.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue :—

Missing, believed Drowned.

Lieut. J. Cropper, R.A.M.C., was educated at Cambridge and at St. Bartholomew's Hospital, and qualified in 1892. He had held appointments at the Huddersfield Infirmary and at the Royal London Ophthalmic Hospital, and later was in practice at Chepstow, Monmouthshire, and joined the R.A.M.C. in November last year. He was on the hospital ship *Britannic* when she was torpedoed, and is reported to have been drowned.

Wounded.

Capt. P. Smith, M.C., R.A.M.C., attached Gloucester Regt.
Capt. W. H. Payne, R.A.M.C.
Capt. H. S. A. Alexander, R.A.M.C., attached West Yorkshire Regt.
Capt. G. B. MacGregor, R.A.M.C., attached Manchester Regt.

THE HONOURS LIST.

The following awards to medical officers are announced :—

Distinguished Service Order.

Major Philip Burnett, Canadian A.M.C.

For conspicuous gallantry and devotion to duty. He took over the command of the bearers at the front and for 48 hours carried out his duties with great skill and determination under very heavy fire.

Military Cross.

Temp. Capt. Mark Blakiston Baines, R.A.M.C.

For conspicuous gallantry and devotion to duty. He tended the wounded under very heavy fire, displaying great courage and determination. He rescued several men who were buried. He has on many previous occasions done fine work.

Capt. Frederick William Brunker, R.A.M.C.

For conspicuous gallantry in action. He continuously went into the open under very heavy fire and attended to the wounded. He displayed great courage and determination throughout.

Temp. Capt. Arthur Barrett Cardew, R.A.M.C.

For conspicuous gallantry and devotion to duty. He tended the wounded under heavy fire throughout the action, displaying great courage and determination.

Temp. Capt. Ralph Annesley Fuller, R.A.M.C.

For conspicuous gallantry and devotion to duty. He led stretcher parties and tended the wounded under intense fire. He displayed great courage and determination throughout the operations.

Temp. Capt. Allen Coulter Hancock, R.A.M.C.

For conspicuous gallantry and devotion to duty. He led a rescue party in the open under heavy fire and rescued 28 wounded men. He displayed great courage and determination throughout the operations.

Temp. Capt. Robert Welton Hogg, R.A.M.C.

For conspicuous gallantry and devotion to duty. With a party of stretcher-bearers he searched the forward area under very heavy fire and brought in many wounded. He has previously done fine work.

Temp. Capt. Edmund Basil Jardine, R.A.M.C.

For conspicuous gallantry and devotion to duty. He tended the wounded continuously for three days and nights under heavy fire, displaying great courage and determination. He has done fine work throughout the campaign.

Temp. Capt. James La Fayette Lauder, D.S.O., R.A.M.C.

For conspicuous gallantry and devotion to duty. He repeatedly with different parties of stretcher-bearers searched the forward area under intense fire and brought in many wounded men. He had previously done fine work.

Capt. Robert Gerald McElney, R.A.M.C.

For conspicuous gallantry and devotion to duty. He led stretcher parties and worked in the open under heavy fire continuously for 34 hours. He set a splendid example of courage and determination.

Temp. Capt. Wilfred McFarlane, R.A.M.C.

For conspicuous gallantry and devotion to duty. He led a stretcher party across "No Man's Land" and attended to the wounded. He worked unceasingly throughout the operations under heavy fire, and set a splendid example.

Temp. Capt. Henry Strawson Turner, R.A.M.C.

For conspicuous gallantry and devotion to duty. He led stretcher parties and tended the wounded under intense fire. On one occasion he rescued eight wounded men in the open.

Bar to the Military Cross.

Temp. Capt. James Henry Fletcher, M.C., R.A.M.C.

For conspicuous gallantry and devotion to duty. He led parties of stretcher-bearers in the open under heavy fire. He displayed great courage and determination throughout the operations. (The award o the Military Cross was recorded in THE LANCET of Jan. 22nd, 1916.)

OBITUARY OF THE WAR.

VICTOR JOHN RUTTLEDGE, M.B., B.CH. DUB.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain V. J. Ruttledge, who died on active service on Nov. 3rd, was youngest son of the late Rev. John Young Ruttledge, D.D., ex-Fellow of Trinity College, Dublin. He received his own medical education at Trinity College, qualifying in 1891, and was appointed in the following year assistant medical officer to the District Asylum, Londonderry, where he had more than 20 years' service. He made two voyages to China on account of indifferent health and was superannuated at the end of 1912. In May, 1915, however, he applied for a commission in the Royal Army Medical Corps, and was sent to the Near East. He died of peritonitis at Suez.

ARTHUR REGINALD HART.

Sub-Lieutenant A. R. Hart, who was killed in action on Nov. 13th at the age of 25, was educated at Christ's Hospital, and when war broke out was a fourth-year medical student at Westminster Hospital. He volunteered as a dresser in the French Red Cross, remaining abroad for 14 months, during part of which time he acted as probationer-surgeon at a base hospital. He then joined the R.N.V.R., of which he was an officer at the time of his death.

GODFREY ALAN WALKER, M.B. LOND.,

SURGEON, ROYAL NAVY.

Surgeon G. A. Walker, who was killed in action on Nov. 14th, at the age of 28, was second son of John Henry Walker, of Mirfield, Yorks, and Rhosneigr, Anglesey. He was educated at Epsom College, where he gained a scholarship, and went on from there to the Medical School of the London Hospital. After taking the qualification of the Conjoint Board, he filled resident posts at the Royal Infirmary, Sheffield, and the Baythorpe Infirmary, resigning the latter in August, 1914, when he volunteered for service. He was 12 months at Cromarty, and then in Gallipoli and France, where he worked until killed by a shell along with two stretcher-bearers as he was attending the wounded.

Surgeon Walker was a keen hockey-player and captain of his hospital team. He was a good sailor, and at Rhosneigr his friends enjoyed many a sail with him in small craft. His senior officer writes of his good work in Gallipoli before and during the evacuation: "We always said of him that the greater the danger the cooler he got, and he could always be depended on in a tight corner."

DEATHS AMONG THE SONS OF MEDICAL MEN.

The following sons of medical men must be added to our lists of those who have fallen during the war:—

Lieut. A. M. Jones, Scots Guards, second son of the late Dr. A. O. Jones, of Harrogate.

T. D. Mugliston, Australian Infantry, second son of the late Dr. H. B. Mugliston, of Sydney, Australia.

THE "VIA DOLOROSA" OF THE SOLDIER.

This is the title of an admirable article by Lieutenant-Colonel Guy N. Stephen, R.A.M.C., in the current number of the *Journal of the Royal United Service Institution*. Colonel Stephen begins by pointing out—what is perhaps too often overlooked—that the collection and disposal of the wounded is only a section of a really efficient army medical department such as ours now is. Nevertheless, the care of the wounded has both an individual and a collective aspect; the wounded soldier must be given his best chance of recovery, and the moral of the troops must not be depressed by the sight of unheeded suffering. He indicates the degree of success attained by the fact that within 48 hours of any big engagement hundreds of men who have taken part in it may be seen leaving Charing Cross Station on their way to complete their treatment in hospitals in their own country. He then describes the successive stages of the dolorous journey of the soldier from "out in front" to the regimental aid-post, the advanced dressing station, field ambulance headquarters, casualty clearing station, and so to hospital barge or base hospital.

Waiting for the Wounded. By Muirhead Bone.
(From Part I. of "The Western Front," published by *Country Life*.)

Our illustration is from "The Western Front," of which *Country Life* publishes the first part to-day. In it Mr. Muirhead Bone pictures three surgeons of a divisional collecting station waiting the arrival of the first laden stretcher-bearers. As the advanced dressing station is generally exposed to shell-fire, and is therefore underground or in some sheltered locality, we may take the picture to represent part of a casualty clearing station. A good insight into the important rôle played by this portion of the "net spread by the R.A.M.C. over the field of war" is also to be gained from the chapter on "The War Doctors" in Lord Northcliffe's recent book, "At the War" (Hodder and

Stoughton. 1916. Pp. 288. Price 5s. net), of which the sale is stated to be bringing in £100 daily to the funds of the Red Cross.

The arrival last Saturday of the hospital ship *St. Denis*, bringing 100 maimed British prisoners exchanged by Germany on account of total and permanent disablement, is a reminder that the dolorous journey may be yet longer and more wearisome, as a large proportion of these men were wounded two and a quarter years ago during the retreat from Mons.

MENTIONED IN DESPATCHES.

In a despatch received from Lieutenant-General G. F. Milne, C.B., D.S.O., Commanding the British Salonica Army, and dated Oct. 8th, 1916, the following references to the medical services occur:—

I desire specially to acknowledge the excellent work rendered by Surgeon-General H. R. Whitehead, C.B., and all ranks of the medical services under his command during a period in which sickness was prevalent. All branches of the Royal Army Medical Corps and the Canadian Army Medical Corps deserve the greatest commendation and have fully maintained their high traditions of efficiency.

The medical services have been called upon to face problems of great difficulty. It can be easily realised that in a climate varying from severe cold to intense damp heat, and in a mountainous country deficient in water, poorly supplied with roads, without local resources, and where dysentery and malaria are rife, the duties and responsibilities of these services must necessarily be heavy. Experiments as to the most efficacious types of mountain ambulance transport had been conducted in the winter and spring, and as a result travois, mule litters and cacolets now form integral portions of each field ambulance.

During the same period exhaustive measures were taken for an antimalarial campaign. Officers with special knowledge were appointed to supervise antimalarial work; swampy areas were drained and the defensive lines then held carefully surveyed with a view to only the most healthy portions being held. Although malaria has still been the prevailing disease, yet I feel certain that these careful precautionary measures have been greatly instrumental in lessening its intensity. The move to the valley of the Struma in June tested all the preparations made, and severely tried the medical resources. The area occupied was found to be highly malarious, the heat intense and damp, and the single road from the base long, hilly, and of uneven surface. The organisation of this line of evacuation and the arrangement of halting-places and refilling points was, however, successfully undertaken.

The work performed by the motor ambulance convoys was invaluable. Running practically continuously, they succeeded in coping with the calls made upon them, difficulties were minimised by the forethought and energy displayed, and the sick were transferred with satisfactory expedition to the base hospitals.

The preparations for offensive operations on the Doiran front towards the end of July necessitated further developments in the rearward medical services. Efficient ambulance railway trains were improvised from local rolling-stocks, and a railway line of evacuation organised. From the eastern extremity of the British line of defence evacuation by sea is the only feasible course. Three distinct systems are therefore in operation at one and the same time, by railway, by road, and by sea, all converging on one base.

When active operations commenced the rôles of the various forms of mountain ambulance transport organised for the field ambulances became apparent. On open hillsides, along the beds of ravines, over slopes covered with scrub, relay parties of stretcher-bearers, travois, litters and cacolets, conveyed the wounded back to the dressing stations. The use of improvised methods in action shows vividly the special conditions under which the medical services of the army have been called upon to work, and has necessitated the closest coöperation between staffs and medical units.

The advice of the consultant physicians and surgeons, and of the medical experts who have visited this army, has considerably aided in the maintenance of a high standard of technical efficiency. The close touch in matters of sanitation between the medical services of field formations, the staff, and unit commanders, has been of the greatest benefit in maintaining the health and comfort of the troops.

I cannot conclude my remarks on the medical services without paying testimony to the devoted service rendered by the nursing sisters belonging to the various hospitals. By their skill, care, and attention at a time of great stress under trying climatic conditions the sufferings of the patients have been largely alleviated.

I further wish to thank the British Red Cross Society and Order of St. John for its help and assistance. The Commissioner, Mr. H. L. Fitzpatrick, has been indefatigable in his endeavours for the welfare and comfort of the sick and wounded in both the base hospitals and field units.

The names of the following medical officers are given as deserving of special mention:—

Staff.—Surg.-Gen. H. R. Whitehead, C.B.

Army Medical Service.—Col. A. A. Sutton, D.S.O.; Col. M. P. C. Holt, C.B., D.S.O.; Col. G. T. Ravensley, C.M.G.; Temp. Col. J. P. Stewart, C.B., Captain, 4th London General Hospital, R.A.M.C. (T.F.); and Temp. Col. T. C. English, Captain, 4th London General Hospital, R.A.M.C. (T.F.).

Royal Army Medical Corps.—Bt. Col. (temp. Col.) F. Smith, C.M.G., D.S.O.; Lieut.-Col. J. R. Whait; Lieut.-Col. (temp. Col.) P. MacKessack; Lieut.-Col. (temp. Col.) W. H. S. Nickerson, V.C., C.M.G.; Lieut.-Col. A. R. Aldridge, C.S.I. (Res. of Off.); Lieut.-Col. J. C. Connor; Lieut.-Col. S. H. Withers; Lieut.-Col. L. F. Smith; Lieut.-Col. E. T. F. Birrell, C.M.G.; Lieut.-Col. M. M. Lowsley; Lieut.-Col. F. Ashe; Major (temp. Lieut.-Col.) S. L. Pallant; Major (temp. Lieut.-Col.) C. W. Holden; Major J. T. Johnson; Major G. Ormrod; Major E. L. Moss, M.C.; Major W. J. Weston; Capt. (temp. Major) P. S. Tomlinson; Capt. (temp. Major) R. E. Kelly, R.A.M.C. (T.F.); Capt. (temp. Lieut.-Col.) H. G. G. Mackenzie; Capt. (temp. Lieut.-Col.) G. T. Willan; Capt. (temp. Major) T. H. Peyton; Capt. R. E. Bickerton; Capt. C. W. Greene; Capt. R. M. Vick; Capt. T. Carnwath; Capt. W. R. Galwey; Capt. C. T. Edmunds; Capt. W. E. C. Lunn; Capt. O. R. McEwen; Capt. E. M. Middleton; Capt. N. V. Lothian; Capt. A. A. Atkinson (Spec. Res.); Capt. F. Crosbie (Spec. Res.); Temp. Capt. T. E. Parker; Temp. Capt. J. F. Bourke; Temp. Capt. D. Bell; Temp. Capt. K. G. Fraser; Temp. Capt. W. A. L. H. Henderson; Temp. Capt. H. P. Hamilton; Temp. Capt. G. B. Burwell; Temp. Capt. R. S. Dewar; Temp. Capt. R. A. Mansell; Temp. Lieut. J. V. Grant; Temp. Lieut. C. S. Dodson; and Temp. Lieut. H. F. Brice-Smith.

Canadian Army Medical Corps.—Col. J. A. Roberts; Lieut.-Col. W. B. Hendry; Lieut.-Col. E. C. Hart; Major C. H. Morris; and Capt. W. A. Clarke.

New Zealand Medical Corps.—Lieut.-Col. D. J. McGavin.

Indian Army.—Capt. F. F. S. Smith, I.M.S.; and Asst.-Surg. H. A. H. de Silva, I.M.S.

INSURANCE BENEFITS FOR DISABLED SOLDIERS.

In Circular A. S. 183 the Insurance Commissioners for England, Scotland, Ireland, and Wales make recommendations with regard to persons who have become permanently incapable of following their ordinary occupations, with particular reference to soldiers discharged with pensions, their view being that a man, although he cannot follow his usual occupation, may yet be fitted for some other kind of work. Attention is called to the conditions arising where there is partial recovery and to the desirability of considering the member's state of health when the claim for benefit is made, taking into account the possibility of there being work reasonably open to him for which he is fit, or could have fitted himself. A paragraph may be noted by medical practitioners which reminds societies that "a medical certificate of incapacity, whilst necessarily entitled to great weight in considering a claim for benefit, is not conclusive; and this fact becomes of special importance wherever it appears probable that, in giving a certificate that a partially disabled man is incapable of work, a doctor has had in mind no more than the inability of the man to resume the employment by which he gained his livelihood before his period of military service." It may be pointed out that it is not necessary that "what the doctor has had in his mind" when giving a certificate should be a question of "probability" only. Forms of certificate should be drafted which would make quite clear to the medical man the points as to which he is asked to certify. His opinion then, if not conclusive, would at any rate not be left to be interpreted conjecturally. Whatever part, however, the approved societies may be called upon to bear in the pensioning of our wounded soldiers and sailors for their war injuries, it is likely that generous treatment, as distinct from strict penny for penny compensation for loss of wage-earning capacity, will be expected by them, and insisted upon by their countrymen.

THE BRITISH RED CROSS SOCIETY.—Messrs. Christie will hold a sale for the benefit of the Red Cross at the end of March. Collectors and donors are asked to aim at making the sale a greater success if possible than that held last year, which realised more than £100,000. The Red Cross Gift House, Pall Mall, will be closed for the purposes of sale on Dec. 16th, but will be open for the reception of articles for the forthcoming sale.—The Joint War Committee of the British Red Cross Society and the Order of St. John of Jerusalem have offered to the Queen of Italy as a Christmas gift £10,000 worth of medical stores for the Italian wounded.—A Red Cross Fair will be held from Feb. 15th to 17th inclusive by the Committee of the County of London Branch of the British Red Cross Society at the Central Hall, Westminster. Offers of help should be addressed to the secretary, 57, Charing Cross, Trafalgar-square, W.C.

THE WAR EMERGENCY AND PANEL PRACTITIONERS.—The London Panel Committee have decided to keep a register of practitioners who have time at their disposal which they would be prepared to devote to looking

after the practice of members of the panel absent on war service. Anyone willing to render such assistance will be asked to furnish particulars as to the amount of time each day during which he would be able to do so. He is also invited to state whether he would be able to undertake work in a district other than that in which he resides. The secretary of the Panel Committee has frequently been applied to for information on this subject by practitioners who have been given commissions in the Royal Army Medical Corps, and it is hoped that members of the medical profession in London may still be available who can devote a fair amount of time to thus assisting their colleagues.

NEW MILITARY ORTHOPÆDIC CENTRES.—At the Cardiff Mental Hospital, now used as a general military hospital—the Welsh Metropolitan War Hospital, Commandant Lieutenant-Colonel E. W. Goodall—300 beds are to be given up to orthopædic cases. This arrangement has been made by the War Office at the instance of Lieutenant-Colonel Robert Jones. Fifty further beds at the hospital will be set aside for the preparation of stumps in order later to fit the wounded soldiers with artificial limbs. This will be done at the Prince of Wales's Hospital, Cardiff, under Lieutenant-Colonel Lynn Thomas, consulting surgeon to the Western Command.

A hospital for limbless soldiers is about to be opened at the new buildings erected in connexion with the Ulster Volunteer Hospital in the grounds of Belfast University. Colonel Robert Jones (who is chief organiser of such institutions under the War Office) has nominated Mr. A. B. Mitchell, F.R.C.S. Irel., surgeon to the Royal Victoria Hospital, Belfast, to take charge of this new organisation. He will hold the temporary rank of Lieutenant-Colonel, and will be responsible to the War Office through Colonel Robert Jones.

THE NEED FOR TROPICAL SANITATION.—In an article on the need for an organised application of tropical hygiene to our armies in the East, published in the current issue of the *Journal of Tropical Medicine and Hygiene*, Professor W. J. Simpson recalls Lord Derby's statement that during three spring months of this year the admissions to hospital in the Mesopotamian Army of British troops alone averaged nearly 2750, and the deaths over 100 weekly, and attributes this grievous wastage to lack of forethought and of any conception of the diseases which were likely to arise among troops campaigning in tropical heat. He suggests the creation at the War Office of a Board of Tropical Sanitation, composed of men with practical experience whose business it will be to maintain the health of the armies in the Eastern area, and the appointment of an inspector-general of sanitation for each army corps as consultative officer.

SCOTTISH WOMEN'S HOSPITALS.—At a meeting of the British Women's Hospital Committee, held at the Palace Theatre on Nov. 12th in aid of the funds of the London Units of the Scottish Women's Hospitals, Sir J. Forbes Robertson, who presided, said that in less than a year the Committee had raised £150,000 for the Star and Garter Home. The Committee now wished to raise funds for the Scottish Women's Hospitals. Contributions amounting to £1000 were announced, the moving and humorous speeches of Mrs. Compton, Mr. Pett Ridge, Lady Frances Balfour, Lady Robertson, and others conducing to this fine result.

THE WORK OF THE Y.M.C.A.—The secretary of this association, who has just returned from inspecting the work of the association at the front, states that there are now in one area 20 or 30 huts in dug-outs right up to the advance bases. The interests of officers as well as men are looked after, and in one area a large club has been established. The educational work includes lectures for both officers and men. More huts are urgently needed. It is interesting to note that the Y.M.C.A. War Fund has now reached £1,000,000. Promises of £5000 towards the erection of huts have been made by the milling trade, and it is anticipated that £10,000 will be raised at the Corn Exchange and a similar sum at the Baltic Exchange.

THE Government have taken over the Portman Rooms, Baker-street, in order to relieve the pressure at the military hospital for officers at the Great Central Hotel.

THE President of the French Republic has conferred the Croix de Guerre upon Temporary Captain G. F. P. Heathcote, R.A.M.C.

Correspondence.

"Audi alteram partem."

THE DIAGNOSTIC VALUE OF AGGLUTININ DETERMINATIONS IN INOCULATED INDIVIDUALS.

To the Editor of THE LANCET.

SIR,—Captain E. W. Ainley Walker's article in THE LANCET of Nov. 25th, illustrating the diagnostic value of agglutinin determinations in inoculated individuals, raises several interesting points, not the least important of which is the attitude which certain laboratory workers appear to adopt towards clinical medicine. This attitude is admirably illustrated by Captain Ainley Walker in the following words:—

> Now, it is obvious that under present conditions no one would willingly or consciously assume the grave responsibility entailed in failure to detect cases of typhoid or paratyphoid fever which are capable of being readily detected. Yet this is what must necessarily occur, to the gross prejudice of general hygiene and efficiency, if only those cases of "enteric fever" are detected which yield a positive result by culture methods. On the other hand, the agglutination test, when suitably carried out and appropriately repeated, can be made to yield a uniformly accurate diagnosis in cases examined during active infection.

It is clear from the above statement that Captain Ainley Walker ignores *clinical observation* as a means of detecting typhoid and paratyphoid fevers, while his claim that agglutination tests alone invariably furnish an absolutely infallible diagnosis is much too extravagant. This attitude, if generally adopted, would be equally prejudicial to general hygiene and efficiency. The basis of all efficient hygiene is careful clinical medicine, which is also the foundation on which all laboratory efforts towards more accurate and complete diagnosis must rest. If a case of pyrexia is suspected clinically to be enterica (and *every* case of pyrexia is a possible enteric until shown to be something else), blood culture should be performed at once. If the blood culture is "positive" the diagnosis must be regarded as *absolute*. At the same time, whatever the result of the blood culture, agglutination tests by a strictly quantitative method should be performed and repeated at suitable intervals throughout the disease. The object of this procedure in a case in which an absolute diagnosis by blood culture has been obtained is not to diagnose the case—that has already been accomplished beyond dispute—but to furnish *agglutination results controlled by blood culture*. The data so obtained are essential as a guide to the interpretation of agglutination results in other cases in which blood culture has failed to give a diagnosis, but—and this is the point which I wish most strongly to urge—*the diagnosis of a case in which blood culture is negative should not as a rule rest on the interpretation of the agglutination results alone*, on the general principle that it is not good practice to diagnose any disease on one sign or symptom. On that principle the agglutination test, even "when suitably carried out and appropriately repeated," as Captain Ainley Walker would like, is not *per se* a method of diagnosis of disease. It is a method by which extremely important information, positive or negative from the point of view of diagnosis, may be obtained in the majority of cases, but in arriving at that diagnosis the results obtained by agglutination should be interpreted in conjunction with the other clinical signs and symptoms of the disease. The extent to which Captain Ainley Walker's mind is obsessed with agglutination as a method of diagnosis *per se* is well illustrated by Case 4 in his article. The clinical facts which he supplies regarding this case are: "Onset with shivering and headache. Three smart rises of temperature to 105°, 103·5°, and 102·5° F. respectively, on the *first*, *third*, and *fifth* day of the illness simulating tertian ague. No malarial parasites in the blood. From the fifth day onwards temperature subnormal and rising to normal." This clinical picture is incomplete, but it is hardly necessary to point out to anyone with clinical experience of enterica and malaria that it is, so far as it goes, a typical clinical picture of a mild infection of benign tertian malaria.

Captain Walker says there were no "malarial parasites in the blood," by which, I presume, he means that the blood was examined for malarial parasites and none were found. That, of course, does not necessarily mean that there were "no malarial parasites in the blood," and, having regard to the perfect tertian periodicity of the pyrexia, the conclusion is almost irresistible that there were malarial parasites in the blood which escaped detection. Yet, in spite of the clinical facts which pointed strongly to benign tertian malaria, Captain Ainley Walker diagnoses the case as one of "typhoid fever in a T.-inoculated individual" on one sign—namely, a fluctuation of 350 per cent. in the T.-agglutinin content of the blood with maximum at or near the seventeenth day of disease. With reference to the diagnosis of this case I should like to ask Captain Walker the following questions:—

1. Has he ever seen an uncomplicated case of typhoid fever produce perfect tertian periodicity of temperature?

2. Has he ever seen a case of typhoid fever (whether in an inoculated or uninoculated individual) proved by blood culture, in which the pyrexia lasted only five days?

3. How many cases of benign tertian malaria, proved by the discovery of the parasite in the blood, has he seen in T.-inoculated individuals in which careful estimations of the T.-inoculation agglutinin have been repeated as in Case 4, to show that a fluctuation of 350 per cent. in the T.-inoculation agglutinin cannot possibly be due to benign tertian malaria?

This case, it should be noted, came from the Mediterranean area, an area where malaria was common and commonly mistaken for enterica. In diagnosing such cases as typhoid fever *on agglutination alone* Captain Walker tends to bring discredit on a method which, when kept in its proper place, is capable of furnishing most useful information in the elucidation of many puzzling pyrexias.

The second point of interest raised by Captain Walker's article is the use of the graphic method of representing the fluctuations in the agglutinin content of the blood which takes place in inoculated individuals during active enterica. His diagrams would have appealed more strongly to me had the points found by examination been joined by straight lines. The diagrams might then have lost some of their apparent mathematical accuracy and symmetry, but that loss would, in my opinion, have been more than counterbalanced by the knowledge that they represented series of ascertained facts only—and not, as at present, series of ascertained facts with interpolated figments of imagination. This interpolation is well seen by studying the placing of his maxima. In a previous communication[1] by Major G. Dreyer and Captain Walker, the following clear and emphatic statement is made:—

4. In following out the titration of the patient's serum on several successive occasions it will frequently be found that the maximum has fallen between two dates of observation. And two successive observations at about the same level do not mean that the curve is stationary at this point but merely that the maximum has occurred between there (? misprint). Similarly if the two highest observations are at different levels, it does not follow that the highest titre observed represents the maximum of the agglutination curve, *but it does follow that the maximum has occurred between these points.*

The last sentence of this paragraph, which I have italicised, is, of course, not strictly correct. The maximum of any curve lies either between the highest recorded reading and the one immediately preceding it, or between the highest recorded reading and the one immediately following it—that is to say, it takes three readings on a curve to determine always with certainty the limits within which its maximum lies. Captain Walker departs from his own rule regarding the position of the maximum in Cases 4, 5, 8, 11, and in Case 6 actually indicates a maximum in the T. curve between his first and second observations, although all the T. estimations from the first show a progressive slow fall in the T. agglutinin! I would be greatly obliged if Captain Walker would explain why Case 10 is "clearly a case of B infection."

In conclusion, I would assure Captain Walker that I sing him no "hymn of hate."[2] I do not believe that personal emotions such as love or hate can possibly enter into discussions on purely scientific matters. I would further assure him that my criticism is not in any way directed against Dreyer's technique, for I believe that the Oxford School of Pathology has, by working up this method to its present state of accuracy, performed a great service to medicine in general, and to military medicine in particular. This service has been duly recognised by the Medical Research Committee in placing the materials necessary for following out the method at the disposal of all workers in military hospitals. My criticism is directed in all good faith, firstly, against what I believe to be a total lack of balance in Captain Walker's mind regarding the relative value of accurately ascertained clinical facts and accurately determined agglutinin estimations—an attitude which leads him to unnecessarily grave apprehensions regarding general hygiene and efficiency, and which is bound to lead in certain cases to errors in diagnosis which he appears anxious to avoid. My criticism is directed, secondly, against what I believe to be a too free play of the imagination in his use of the graphic method of recording observed serological data.

I am, Sir, yours faithfully,

R. P. GARROW,
Captain, R.A.M.C.

London, Dec. 8th, 1916.

[1] The Diagnosis of the Enteric Fevers in Inoculated Individuals by the Agglutinin Reaction, THE LANCET, Sept. 2nd, 1916.

[2] Vide Dr. P. N. Panton, THE LANCET, Oct 28th, 1916.

EPSOM COLLEGE.

To the Editor of THE LANCET.

SIR,—In consequence of the loss of many annual subscriptions as a result of the war, and in part due to the fact that so many medical men are engaged away from their homes on military duties, it becomes necessary to obtain fresh annual subscribers if the good work of the Royal Medical Foundation attached to Epsom College is to be maintained.

Your readers will see from the advertisement which appears on p. 7 of THE LANCET of Dec. 9th that a sum of £4500 has to be collected each year in order to provide the same number of pensions and Foundation scholarships which hitherto have been given annually out of the Foundation Fund of the College. To reduce the number of beneficiaries would be deplorable from every point of view, more especially as the present excessively high war-prices are greatly increasing the hardships endured by the very indigent persons who are candidates for the benefactions given by the College.

Much help might be rendered if those interested in the welfare of the College would urge their friends to become subscribers or donors, to whom in return certain voting privileges are afforded. Donors of 10 guineas and collectors of 20 guineas are life governors, and subscribers of 1 guinea annually are governors during the continuance of their subscriptions. Such life governors and governors have ten votes each, which may be given for Foundation scholars alone, or for pensioners alone, or be divided between the two classes. Smaller contributions are gladly received.

In conclusion, I desire to make a very earnest, urgent appeal to the profession not to allow other new professional philanthropic movements, however excellent in themselves, to prejudice the claims and diminish the possibilities for doing good of Epsom College Foundation Fund.

I am, Sir, yours faithfully,

HENRY MORRIS,
Honorary Treasurer.

8, Cavendish-square, W., Dec. 9th, 1916.

THE MOBILISATION OF THE MEDICAL PROFESSION.

To the Editor of THE LANCET.

SIR,—In the article on this subject appearing in your issue of Dec. 9th you say—

We believe that the general opinion of the medical profession, judging from the correspondence that comes to us, is in favour of medical mobilisation.

What you mean by "medical mobilisation" is not quite clear, but as your words have been eagerly seized upon by the Medical Correspondent of the *Times*, who, in my opinion, consistently misrepresents the profession, I cannot help fearing the worst. If this "mobilisation" were part and parcel of a general mobilisation of the civil population, as has been recently seen in Germany, I do not

doubt that all medical practitioners would be quite willing to take their share in it. But if, on the other hand, the "mobilisation" be a system of compulsion for war purposes of the medical profession *only*, I must express my surprise at the tenor of the correspondence you have received. I have always been a careful reader of THE LANCET, but have hitherto seen nothing warranting such a conclusion. However, if such is the case, it is all the more necessary that those who have some regard for the liberties of the profession should have a hearing in your columns. I would therefore ask you to record my most emphatic protest against any mobilisation of the latter kind. That a common burden should be borne equally by all is one of the fundamental principles of the British Constitution; but that a section of the community should be compelled to undertake duties not shared by the rest is altogether foreign to it. To tyrannise over the medical profession in such a manner seems to me almost inconceivable. It has already done voluntarily far more than its share in the present crisis, and, like a "willing horse," is to be overloaded.

For more than 30 years I have consistently endeavoured in medical politics to uphold the dignity and honour of the profession. From my position on many medical bodies I may fairly claim to be a representative practitioner, and to know something of the views of my constituents, and it fairly takes my breath away to read in the pages of THE LANCET such a misrepresentation of our views—that is, if the mobilisation signified is one of the latter description. Such tyranny, I believe, would, and should, meet with the strongest opposition. When the civil population generally is shifted about the country compulsorily the medical profession may be expected to fall into line. That a time may come when this is necessary is quite possible. I am well aware that during a great war we can none of us expect to enjoy the same liberties as in times of peace, but in order that the resources of the country may be utilised to the fullest extent there must be equity all round; there must be no special class legislation. The fruits of such must inevitably be disunion and dissatisfaction.—I am, Sir, yours faithfully,

Hackney-road, N.E., Dec. 9th, 1916. MAJOR GREENWOOD.

*** Dr. Major Greenwood indicates exactly where the main difficulty arises. Should the medical profession await a general movement for the utilisation of man-power for the war, or should we take steps to organise ourselves with that object, thus recognising that our position is not that of other citizens?—ED. L.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.

ENGINEER, SOHAB K., M.R.C.P.E., has been appointed Honorary Physician to Sir J. J. Hospital, Bombay.

MACKARELL, W. W., M.D. Liverp., D.P.H., D.T.M., Pathologist to Leicester Royal Infirmary.

SHAW, EDITH A., M.B., B.S. Lond., M.R.C.S. Eng., L.R.C.P. Lond., House Physician to Victoria Hospital for Children, Tite-street, Chelsea.

Certifying Surgeons under the Factory and Workshop Acts: CREssy, C. J., L.R.C.P. Lond., M.R.C.S. (Ringwood, Hants); and NICHOLL, R. C., L.R.C.P., L.R.C.S. Irel. (Lytham, Lancs).

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).
When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BIRKENHEAD EDUCATION COMMITTEE.—Assistant School Medical Officer. Salary £350 per annum.

BOURNEMOUTH, ROYAL VICTORIA AND WEST HANTS HOSPITAL.—House Surgeon, unmarried, for six months. Salary £200 per annum, with board, &c.

BRISTOL ROYAL INFIRMARY.—House Physician. Salary at rate of £120 per annum, with board, &c.

BURNLEY, VICTORIA HOSPITAL.—House Surgeon. Salary £160 per annum, with board, &c.

CHILDREN'S INFIRMARY, Cleveland-street, London, W.—Female Assistant Medical Officer. Salary £250 per annum, with residential allowances.

CLINICAL RESEARCH ASSOCIATION, Watergate House, York-buildings, Adelphi, W.C.—Assistant Director of Laboratories. Salary not less than £250 per annum.

CROYDON UNION INFIRMARY.—Resident Assistant Medical Superintendent of Union Infirmary and Assistant Medical Officer of Union House and Children's Homes. Salary £250 per annum, with residential allowances.

GENERAL LYING-IN HOSPITAL, York-road, Lambeth.—Resident Medical Officer for three months. Salary £100 per annum, with board, &c.

LANCASTER, COUNTY ASYLUM.—Female Assistant Medical Officer. Salary £250 per annum, with board, &c.

LIVERPOOL, ROYAL SOUTHERN HOSPITAL.—Three House Surgeons (Male or Female) for six months.

LONDON TEMPERANCE HOSPITAL, Hampstead-road, N.W.—Assistant Resident Medical Officer. Salary £120 per annum, with board, &c. Also Casualty Officer (non-resident). Salary £120 per annum.

MANCHESTER, ANCOATS HOSPITAL.—Two unqualified Residents. Salary £50 per annum, with board, &c.

MANCHESTER, HULME DISPENSARY, Dale-street, Stretford-road.—House Surgeon. Salary £250 per annum, with apartments, &c.

NORTHAMPTON COUNTY.—Temporary Tuberculosis Officer. Salary at rate of £450 per annum.

PADDINGTON GREEN CHILDREN'S HOSPITAL, London, W.—House Physician. Salary £160 per annum, with board, &c.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL HOSPITAL.—House Physician. Salary £200 per annum, with board, &c.

ROTHERHAM HOSPITAL.—Junior House Surgeon. Salary £150 per annum, with board, &c.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Second Clinical Assistant in Gynæcological Department. Also Female Pathologist to Venereal Diseases Department (part-time). Salary at rate of £200 per annum. Also Two Senior Assistants in Venereal Out-patient Department. Salary at rate of 156 guineas per annum.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, W.—Resident Surgical Officer.

ST. PANCRAS DISPENSARY, 39, Oakley-square, W.—Resident Medical Officer. Salary £150 per annum, with residence, &c.

SAMARITAN FREE HOSPITAL FOR WOMEN, Marylebone-road, N.W.—Registrar. Salary at rate of £50 per annum.

SHEFFIELD UNION HOSPITAL, Firvale.—Two Female Resident Assistant Medical Officers. Salary £250 per annum, with rations, &c.

SHREWSBURY, SALOP COUNTY COUNCIL.—Temporary Tuberculosis Medical Officer. Salary at rate of £500 per annum.

SOUTH LONDON HOSPITAL FOR WOMEN, South Side, Clapham Common, S.W.—Female Medical Officer in Charge of Gynæcological Clinic. Also Female Medical Officer in Charge of Skin Clinic. Also Pathologist, part time only.

SURREY EDUCATION COMMITTEE.—Temporary School Dentist. Salary £300 per annum.

VENTNOR, ISLE OF WIGHT, ROYAL NATIONAL HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST ON THE SEPARATE PRINCIPLE.—Assistant Resident Medical Officer.

WESTMORLAND SANATORIUM, Meathop, Grange-over-Sands.—Second Assistant Medical Officer. Salary £200 to £250 per annum, with board, &c.

WEST RIDING OF YORKSHIRE.—Assistant Medical Officer at the Cardigan Sanatorium, Carr Gate, near Wakefield, and the Middleton-in-Wharfedale Sanatorium, near Ilkley. Salary £400 per annum.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Harrogate, Yorks.

Births, Marriages, and Deaths.

BIRTHS.

BENJAFIELD.—On Dec. 1st, at New Cavendish-street, W., the wife of J. Dudley Benjafield, Captain, R.A.M.C.—a son.

FRENCH.—On Dec. 7th, at Wimpole-street, Cavendish-square, W., to Dr. and Mrs. Herbert French—a daughter.

HUTCHINSON.—On Oct. 28th, at Malabar Hill, Bombay, the wife of Major L. T. Rose Hutchinson, Indian Medical Service, of a son.

OGILVY.—On Dec. 9th, at Long-grove House, Epsom, the wife of David Ogilvy, M. D., of a daughter.

MARRIAGES.

GLENNY—ELLIOTT.—On Dec. 9th, at St. John's Church, Clifton, Elliott Thornton Glenny, M.B., B.S. Lond., Captain, R.A.M.C., to Rachel Winifred, eldest daughter of Christopher Elliott, M.D., of Clifton, Bristol.

MACALPINE—JONES.—On Dec. 7th, at All Souls' Church, Langham-place, London, Captain James B. Macalpine, F.R.C.S., to Doris, younger daughter of Mr. and Mrs. Herbert Jones, of Oswestry.

DEATHS.

BROOKHOUSE.—On Dec. 3rd, Herbert Orpe Brookhouse, M.D., aged 33 years.

CORSER.—On Dec. 5th, at the Manor House, Bourton-on-the-Water, Glos., Francis Richard Sandford Corser, M.B., aged 56.

EVANS.—On Dec. 10th, at Leith Mansions, Malda-vale, Murray D. Evans, M.R.C.S., L.R.C.P., aged 25.

MCELWEE.—On Dec. 9th, at the Royal Naval Hospital Haslar, Deputy-Surgeon-General John McElwee, R.N. (retd.), aged 55.

RENSHAW.—On Dec. 6th, at his residence, Beech Hurst, Ashton-on-Mersey, Charles J. Renshaw, M.D., aged 75.

WINTLE.—On Dec. 11th, at Kingsdown, Strawberry Hill, Twickenham, Henry Wintle, M.R.C.S., M.B., aged 72.

WYER.—On Dec. 11th, at Epperstone House, Leamington Spa, Otho Francis Wyer, M.D., J.P., aged 79 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

THE BATTLE OF THE WIGS.

A CORRESPONDENT has sent us a well-preserved copy of "The Battle of the Wigs," a medical *jeu d'esprit* to which allusion is often made, though the original is rarely seen. The verses were published as an additional canto to the well-known poem of Dr. Garth, "The Dispensary," and the occasion of publication was certain disputes between the Fellows and Licentiates of the Royal College of Physicians of London. These disputes were dealt with by Dr. Bonnell Thornton, the author of the squib, in a very broad manner, no personalities being indulged in, and no prominent doctor being specially designed for ridicule. It seems that about 1768 the Fellows, in order to mark the respective rights of themselves and the Licentiates holding the lower diplomas, decided that the management of the College must remain with the heads of the hierarchy; and, according to Dr. Thornton's muse, who is unsupported by cold fact, the Fellows, expecting trouble with the more numerous Licentiates, garrisoned their College building with butchers to repel an organised attack of the Licentiates, who had employed blacksmiths to break open the College gates in Warwick-lane:—

> Within the gates close-bolted, lock'd, and bar'd,
> Of neighb'ring BUTCHERS stands an awful guard;
> Each with an azure apron strung before,
> And snow-white sleeves, as yet unstain'd with gore:
> The foe the whetting-iron hears dismay'd,
> Grating harsh musick from the sharp'ning blade.
>
> From *Newgate Market* came the bloody bands,
> With marrow-bones and cleavers in their hands,
> Fram'd to split skulls, and deal destructive knocks,
> To fell a doctor, or to fell an ox;—
> Fit instruments to quash a foe, then ring
> A peal of triumph,—*Ding dong, ding dong, ding.*
>
> No wonder, butchers should physicians aid;
> The same their practice, nor unlike their trade:
> And what alliance more exactly suits?
> Man-killers leagued with those who slaughter brutes.
>
> Nor yet on these alone the Dons rely,
> But they prepare a mask'd artillery.
> A water engine, charg'd with beastly gore,
> Stands ready on the foe its filth to pour.
> And what than this can cast a greater dread,
> Design'd to change the sable coat to red?

The poem ends with the intervention of Pluto, who appears in full pantomimic guise, black-coated, red-legged, and plumed, and insists on the suspension of civil war between medical men:—

> "Though Doctors differ;—for the human tripe
> Though some the purge prefer, and some the pipe;
> Or in th' intestines raise the sharp commotion,
> Some with a pill, and others with a potion;
> Though, to apply the flayer of the skin,
> Some hold a virtue, others ho d a sin;
> In *Antimony* some their trust repose,
> And some in *Mercury*,—to save a nose;
> In this one point ye never disagree,—
> Ye're all unanimous—about the fee.
>
> "Come then, my friends, (for now methinks I spy
> A mild complacency in ev'ry eye,)
> Think on the meed, that tickles sweet your hand,
> The glitt'ring meed, no Doctor can withstand."

Pluto then disappeared in a triumphal car shaped like a hearse and drawn by six coal-black steeds, through Warwick-lane, down Ludgate-hill, to the Fleet Ditch, which is pictured as being in direct connexion with Acheron. Into this polluted stream the god disappears, with a strong perfume of asafœtida. Thereafter, presumably, peace prevails, for the last couplet of the poem is—

> Their feuds forgot, the Doctors, with amaze
> And rev'rent awe, on the procession gaze.

The special knowledge of classics and the general knowledge of contemporary literature displayed by Dr. Thornton in his poem of 260 lines is really remarkable.

HEALTH OF SEYCHELLES.

ACCORDING to the annual report of the Governor of Seychelles, Lieutenant-Colonel C. R. M. O'Brien, C.M.G., the estimated population of the colony on Dec. 31st, 1915, was 24,435 (12,435 males and 12,000 females), an increase, as compared with the previous year, of 294. The birth-rate for the year was 27·78 per 1000 and the death-rate 16·33 per 1000. The number of in-patients treated in the Victoria Hospital in 1915 was 548, and 1989 persons received attention at the Government dispensaries. During the months of July and August there was an epidemic of mild dengue fever, but the cases were far from being typical. In the last two months of the year a considerable number of cases of an extremely acute and severe form of cellulitis were met with; the infection generally occurred in the legs. The treatment adopted was free incision of the infected areas, followed by baths and constant application of hypertonic saline solution, as recommended by Colonel Sir Almroth Wright; this proved most successful, the infected areas healing with surprising rapidity. An epidemic of jaundice broke out towards the end of the year, but was quickly subdued. The Chief Medical Officer reports no diminution in the number of cases of venereal disease or of ankylostomiasis. The hookworm expert who is being sent by the International Health Commission to advise as to the best means of combating the spread of the last-named disease is not expected to arrive in Seychelles before the end of 1916. In anticipation of his visit a considerable number of persons were examined in order to ascertain the percentage of population infected with intestinal parasites. The results give the island of La Digue a percentage of 70, and the rest of the colony 41, of ankylostomiasis infection. The number of patients in the Leper Asylum on Dec. 31st, 1915, was 7. The rainfall for the year was 114·88 inches (5·81 inches more than in 1914) and the mean temperature was 80·4° F.

THE LATE EMPEROR OF AUSTRIA AS A PATRON OF MEDICINE.

AT the Vienna Medical Society on Nov. 24th the President, Dr. Sigm. Exner, summarised Emperor Francis Joseph's services to science and the medical world in particular. The reform of secondary education was, he said, the outcome of the *Thun* curriculum, dating from the early part of the Emperor's long reign, which freed the universities from the yoke of scholasticism. The motto "Science and its teaching is free," was due to him as well as its practical application. The new buildings of the General Hospital in Vienna were his work. During his reign the Vienna Medical School attained the high-water mark of its fame under Rokitanski, Skoda, and Hyrtl at first, and later Arlt, Schuh, Dittel, Hebra, Oppolzer, and Türck, while the Emperor did not hesitate to nominate such foreigners as Brücke, Billroth, Nothnagl, and Strümpell to add to its dignity.

IRISH NURSES AND THE COLLEGE OF NURSING, LIMITED.

To the Editor of THE LANCET.

SIR,—I am at a loss to understand how your Irish correspondent has ascertained "the fact that membership of the College is open not merely to trained nurses but to those practising any branch of nursing, such as mental nursing or massage, and that the latter are to have equal voice with fully trained members in the government of the College."

On reference to the Memorandum and Articles of Association it will be seen that membership of the College is strictly limited to nurses who possess a certificate of proficiency in *general* nursing (medical and surgical), and it is the members who govern the College. Obviously, however, a college which aims at becoming the headquarters of the nursing profession in all its branches must have power to grant certificates in any special branches, but such certificates do not carry membership, nor do they entitle the holder to a place on the Register.

I am, Sir, yours faithfully,

M. S. RUNDLE,
Secretary.

Vere-street, W., Dec. 11th, 1916.

FIRE PREVENTION IN HOSPITALS.

THE British Fire Prevention Committee call attention to a series of warning posters which they issue gratuitously. These are 8 inches wide, printed in red, and two of them deal specially with hospitals: No. 10 with Red Cross hospitals, &c., and No. 11 with private hospitals, convalescent homes, &c. These may be obtained in suitable number by the medical officer, matron, or secretary of the hospital upon written application to the Registrar at 8, Waterloo-place, London, S.W.—A useful little manual of 60 pages on "Fire Prevention and Fire Protection" has also just been issued by Dr. Otto R. Eichel, an official in the New York State Department of Health (London: Chapman and Hall. 1916. Price 4*s.* 6*d.*), and contains the measures adopted by the National Fire Protection Association. It is unfortunate that the little book is so expensive.

THE VALUE OF CHOCOLATE AND COCOA.

WE have before now pointed out that some silly things have been said about chocolate which have attempted with an air of authority to discount its value as an article of food. This might very well be repeated to-day, as there is some confusion of thought between the value of sugar and chocolate as subjects for discussion. A chocolate ration in the Austrian Army was thought to be very valuable, and even sugar in a pail of water has often been given as a reviving draught to weary horses, not to mention men. In THE LANCET of 1905 (Jan. 7th and Feb. 14th) we published the results of some special investigations on "Cocoa Chemically and

Physiologically Considered," which are again of interest in these days when food-values are being reconsidered. The great cocoa and chocolate products must be considered by the public in a fair spirit, as they are of real value, although some of them may cause criticism by being too much adorned and too luxuriously flavoured. A loaf of bread or a steak tied up with ribbons and wrapped in fancy paper is still real food. The cocoa, chocolate, and chocolate biscuits which Messrs. Cadbury Brothers have submitted to us may properly be considered as of special importance to workers during these strenuous times. It is obvious that no care or expense has been spared to render them useful and palatable, as well as pure.

H. A.—The author's dramatic way of illustrating the difference in subsequent events, when town and country are compared, is too pictorial for a medical treatise and may be misleading through absence of precision. Of course, a large proportion of these cases are spontaneously set right by growth.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

Monday, Dec. 18th.

OCCASIONAL LECTURE (the President of the Society in the chair): at 5 P.M.

Sir Almroth Wright will deliver a lecture in the Robert Barnes Hall on "Gas Gangrene."

N.B.—Members of all Sections are invited.

Tuesday, Dec. 19th.

GENERAL MEETING OF FELLOWS: at 5 P.M.

Ballot for Election to the Fellowship.

(Names have already been circulated.)

MEETINGS OF SECTIONS.

Wednesday, Dec. 20th.

HISTORY OF MEDICINE (Hon. Secretaries—J. D. Rolleston, Charles Singer): at 5 P.M.

Exhibit of Portraits, Books, &c. (at 4.30 P.M.).

Paper:

Dr. J. D. Roberts: The Medical Interest of Casanova's Memoires

Thursday, Dec. 21st.

DERMATOLOGY (Hon. Secretaries—J. E. R. McDonagh, Henry MacCormac): at 5 P.M.

Cases (at 4.30 P.M.).

ROYAL SOCIETY OF ARTS, John-street, Adelphi, W.C.

WEDNESDAY.—4 P.M., Paper:—Mr. A. C. Benson, C.V.O.: Classical and Scientific Education.

ROYAL MICROSCOPICAL SOCIETY, 20, Hanover-square, W.

WEDNESDAY.—7 P.M., Mr. A. Bacot: Note on the Relation between the Hatching and Development of the Larvæ of the Yellow Fever Mosquito, Stegomyia Fasciata, and the presence of Bacteria and Yeasts.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.

TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

WEDNESDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations. Dr. Simson: Diseases of Women.

THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.

FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.

SATURDAY.—10 A.M., Dr. Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY.—Clinics:—10.30 A.M., Surgical Out-patients (Mr. B. Gillespie). 2.30 P.M., Medical Out-patients (Dr. T. R. Whipham): Gynæcological Out-patients (Dr. Banister). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

TUESDAY.—2.30 P.M., Surgical Operations (Mr. Carson). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. Howell Evans); Nose, Throat, and Ear Out-patients (Mr. C. H. Hayton). Radiography (Dr. Metcalfe). 3.30 P.M., Medical In-patients (Dr. A. J. Whiting).

WEDNESDAY.—Clinics:—2.30 P.M., Throat Operations (Mr. C. H. Hayton). Children Out-patients (Dr. T. R. Whipham); Eye Out-patients (Mr. R. P. Brooks); Skin Out-patients (Dr. H. W. Barber). 5.30 P.M., Eye Operations (Mr. R. P. Brooks).

THURSDAY.—2.30 P.M., Gynæcological Operations (Dr. A. E. Giles). Clinics:—Medical Out-patients (Dr. A. J. Whiting); Surgical Out-patients (Mr. Carson); Radiography (Dr. Metcalfe). 3 P.M., Medical In-patients (Dr. R. M. Leslie).

FRIDAY.—2.30 P.M., Surgical Operations (Mr. Howell Evans). Clinics:—Medical Out-patients (Dr. A. G. Auld); Surgical Out-patients (Mr. B. Gillespie); Eye Out-patients (Mr. R. P. Brooks).

EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITOR," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention should be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, *and when accompanied by blocks it is requested that the name of the author, and if possible of the article, should be written on the blocks to facilitate identification.*

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET should be addressed "To the Manager."

We cannot undertake to return MSS. not used.

Offices: 423, STRAND, LONDON, W.C.

MANAGER'S NOTICES.

ALTERATION IN THE PRICE OF "THE LANCET."

INCREASED war expenses and cost of production necessitate an increase of the price of THE LANCET. Commencing with the first issue in the New Year, the price will be 8*d.* instead of 6*d.* The rates of subscription will remain as revised in October.

TO COLONIAL AND FOREIGN SUBSCRIBERS.

Subscribers abroad are particularly requested to note the rates of subscriptions given on page 4.

The Manager will be pleased to forward copies direct from the Offices to places abroad at the rates shown, whatever be the weight of any of the copies so supplied.

TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, London, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid, and *not* to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

THE COLONIAL AND FOREIGN EDITION (printed on thin paper) is published in time to catch the weekly Friday mails to all parts of the world.

NEWSPAPERS FOR NEUTRAL COUNTRIES.

Newspapers are not at present being sent forward to neutral European countries unless posted direct from the office of publishers or newsagents who have obtained permission from the War Office for this purpose. The Publisher of THE LANCET has obtained the required permission, and he will forward copies direct from the Office to any neutral country on receipt of instructions.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Dec. 13th, 1916.

Date.	Rainfall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Tem.	Wet Bulb.	Dry Bulb.	Remarks.
Dec. 7	...	45	44	36	38	40	Overcast
,, 8	0·05	57	46	40	43	43	Overcast
,, 9	0·20	59	48	38	45	46	Raining
,, 10	0·14	55	45	38	37	38	Cloudy
,, 11	0·01	46	43	38	37	38	Raining
,, 12	0·01	46	42	38	37	38	Overcast
,, 13	...	42	40	38	37	38	Overcast

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

The following journals, magazines, &c., have been received:—Annales de Médecine, Annae Paulistas de Medicina e Cirurgia, Public Health, Revista Odontologica, Journal of Mental Science, American Journal of Public Health, St. Thomas's Hospital Gazette, Interstate Medical Journal.

BOOKS, ETC., RECEIVED.

ALLEN, GEORGE, AND UNWIN, London.
Diary of a French Private, 1914–1915. By Gaston Riou. Translated by Eden and Cedar Paul. Price 5s. net.
Battles and Bivouacs: A French Soldier's Note-book. By Jacques Roujon. Translated by Fred Rothwell.

BALE, JOHN, SONS, AND DANIELSSON, London.
Extra-Ocular Pressure and Myopia. By I. B. Muirhead, M.D. Price 3s. 6d. net.

BUTTERWORTH AND CO., Calcutta.
A Handbook of Surgical Operations for Students. By K. K. Chatterji, F.R.C.S.I. With Foreword by Lieutenant-Colonel R. Bird, I.M.S. Price 7s. 6d. net.

HODDER AND STOUGHTON, London, New York, and Toronto.
At the War. By Lord Northcliffe. Price 5s. net.
Help for the Deaf: What Lip-reading is. By E. F. Boultbee. With Introduction by Sir James F. Goodhart, Bart., Consulting Physician to Guy's Hospital. Price 2s. 6d. net.

MACMILLAN AND CO., London.
Christian Doctrine of Health: A Handbook on the Relation of Bodily to Spiritual and Moral Health. By the Author of "Pro Christo et Ecclesia." Price 2s. net.

NATIONAL LEAGUE FOR PHYSICAL EDUCATION, 4, Tavistock-square, W.C.
Care of the School Child: A Course of Lectures. Edited by James Kerr, M.D., D.P.H., with Introduction by Bishop Boyd Carpenter, K.C.V.O. Price 2s. 6d. net.

PUTNAM'S (G. P.) SONS, London and New York.
Physics and Chemistry for Nurses. By Amy E. Pope. Price 7s. 6d. net.
Home Care of Consumptives. By Ray L. French, M.A. Price 5s. net.

ROUTLEDGE, GEORGE, AND SONS, London.
The Weird Adventures of Professor Delapine of the Sorbonne. By George Lindsay Johnson, M.A., M.D., B.S, F.R.C.S. Price 6s.

SCIENTIFIC PRESS, LIMITED, London.
Human Temperaments. By Charles Mercier, M.D., F.R.C.P. Price 1s. net.

WATTS AND CO., London.
The World's Wonder Stories. By Adam Gowans Whyte. Price 6s. net.

Communications, Letters, &c., have been received from—

A.—Dr. H. Alston, King's Lynn; *Answers*, Lond., Editor of; Mr. E. Arnold, Lond.; Ancoats Hospital, Manchester, Sec. of; Messrs. Arnold and Sons, Lond.; Messrs. Abdulla and Co., Lond.; Mr. R. J. Albery, Lond.; Messrs. Allen and Hanburys, Lond.; A. B.; Admiralty Medical Department, Director General of.

B.—Mr. J. E. Burton, Runcorn; Messrs. Burt, Boulton, and Haywood, Lond.; Messrs. John Bale, Sons, and Danielsson, Lond.; Messrs. Alfred Bishop, Lond.; Dr. G. Blacker, Lond.; Messrs. Burroughs Wellcome and Co., Lond.; Dr. J. Blomfield, Lond.; British Fire Prevention Committee, Lond., General Hon. Sec. of; Rev. J. S. Barber, Farnham; Mr. J. H. Berkowitz, New York; Messrs. T. B. Browne, Lond.; Dr. S. K. Basu, Decca; Board of Control, Maghull, Steward of; Bibliothèque publique et Universitaire de Genève, Sec. of, Bureau of Science, Manila, Librarian of.

C.—Mr. S. W. Cole, Cambridge; Capt. H. F. Comyn, R.A.M.C.; Messrs. Casein, Lond.; Lieut. C. D. H. Corbett, R.A.M.C.; Capt. C. F. Coombs, R.A.M.C.; Mr. R. M. Collins, Lond.; Dr. J. W. Cropper, Lond.; College of Nursing, Lond., Sec. of; Sir John Collie, Lond.; Capt. M. M. Cruickshank, R.A.M.C.; Messrs. E. Cook and Co., Lond.; Dr. W. F. Croll, Aberdeen; Dr. F. G. Cawston, Krugersdorp; Messrs. A. J. Combridge and Co., Lond.; City Library, Manchester N.H., Librarian of.

D.—Messrs. W. Dawson and Sons, Lond.; David Lewis Manchester Epileptic Colony, Warford, Sec. of; Messrs. Davis and Geck, Brooklyn; Mr. C. W. De Morgan, Lond.; Prof. Sheridan Delépine, Manchester.

E.—Erasmic Co., Warrington; Capt. T. P. Edwards, R.A.M.C (T.F.); Messrs. Elliott, Son, and Boyton, Lond.; East Sussex Insurance Committee, Lewes, Clerk to the.

F.—Dr. W. M. Fletcher, Lond.; Factories, Chief Inspector of, Lond.; Messrs. Fannin and Co., Dublin; Messrs. H. Frowde and Hodder and Stoughton, Lond.; Messrs. Farris, Lond.; Fellows Medical Manufacturing Co., New York; Messrs. Fairchild Bros. and Foster, Lond.; Mr. R. Fouracre, Lond.; Mr. J. H. Frazer, Lond.; Dr. E. C. Fischbein, Sonyea, N.Y.

G.—Mr. H. S. Gettings, Lond.; Messrs. Gale and Co., Lond.; Gas Lighting Improvement Co., Lond.; Glasgow Corporation, Libraries Dept., City Librarian of; Grant College Medical Society, Bombay, Joint Hon. Secs. of; Messrs. Gordon and Gotch, Lond.; Mrs. M. Lloyd George, Lond.; Capt. R. P. Garrow, R.A.M.C.; Dr. V. J. Glover, Liverpool; Mr. S. C. Ghose, Devonport; Mr. F. W. Gamble, Lond.; Dr. M. Greenwood, Lond.

H.—Mr. J. Heywood, Manchester; Dr. B. Hawkins, Birmingham; Capt. W. L. Harnett, I.M.S.; Capt. H. B. Harris, R.A.M.C.; Home Office, Lond.; Mr. C. Hodgkin, Reading; Hospital for Sick Children, Lond., Acting Sec. of.

I.—Incorporated Society of Trained Masseuses, Lond., Sec. of.

J.—Mr. I. Jefferiss, Gillingham; Capt. D. Johnston, R.A.M.C.; J. G. M.

K.—Mr. M. G. A. Khan, Delhi; Dr. W. Knight Pinetown, Natal; Messrs. R. A. Knight and Co., Lond.

L.—Dr. C. E. Lea, Manchester; Dr. R. B. Low, Lond.; Capt. I. H. Lloyd-Williams, R.A.M.C.; Messrs. H. K. Lewis and Co., Lond.; Leeds Public Dispensary, Sec. of; Local Government Board, Lond., Sec. of; Messrs. S. Lendrum and Co., Lond.; Messrs. Lee and Martin, Birmingham; Dr. A. J. B. Leckie, Bath; Mr. T. E. Lambart, Ottawa; Messrs. Lee and Nightingale, Liverpool; Messrs. Longmans and Co., Lond.; Dr. T. M. Legge, Lond.; Messrs. E. and S. Livingstone, Edinburgh; Laboratoire de Recherches, Gif, Sec. of; Mr. M. S. A. Latif, Bury; Mr. A. Lawson, Lond.; Mr. A. Langwill, Edinburgh.

M.—Surg. A. E. Maloine, R.N.; Sir James Mackenzie, Lond.; Dr. J. Monteith, Oldham; Messrs. Macmillan and Co., Lond.; Messrs. J. Menzies and Co., Edinburgh; Dr. J. March, Atherton; Maltine Manufacturing Co., Lond; Manchester Clerical, &c., Association; Messrs. Mayer and Meltzer, Lond.

N.—Mr. A. J. Nyulasy, Perth, W.A.; Northamptonshire County Council, Northampton, County Medical Officer of Health of; National Council of Public Morals, Lond., Directory and Sec. of.

P.—Dr. P. Pope, Lond.; Messrs. W. Porteous and Co., Glasgow; Mr. F. C. Pybus, Newcastle-on-Tyne; *The Prescriber*, Edinburgh, Manager of.

R.—Lieut. W. Roche, R.A.M.C.; Dr. A. Routh, Lond.; Registered Nurses' Society, Lond., Sec. of; Messrs. Roberts on and Co., Lond.; Royal College of Surgeons of England, President and Council of; Royal Microscopical Society, Lond.; Royal Society, Lond.; Mrs. A. Richardson, Lond.

S.—Messrs. Saward, Baker, and Co., Lond; Sanitas Co., Lond.; Messrs. G. Street and Co.; Lond.; South Devon and East Cornwall Hospital, Plymouth, Sec. of; Dr. J. D. Smylie, Gibraltar; Messrs. W. H. Smith and Son, Birmingham; Dr. J. M. Schaub, Lond.; Sir Stewart Stockman, Lond.; Capt. J. Sandes; Mr. W. J. Simpson, C.M.G., Lond.; Capt. A. Stokes, R.A.M.C.; Mr. W. F. Stiell, Lincoln; Surrey Education Committee, Kingston-on-Thames, Sec. of; Mr. H. R. Saunders, New York; Salutaris Water Co., Lond.

T.—Messrs. W. Thacker and Co., Lond.; Mr. J. Tewfik, Chester; Dr. W. J. Turrell, Oxford.

V.—Dr. H. Viets, Oxford.

W.—Mr. R. Whitelaw, Aberdeen; Miss A. E. Wigan, Luddesdowne; Capt. C. A. Wickham, R.A.M.C.; Messrs. Gerth Van Wyk and Co., Lond.; Walsall and District Hospital, Walsall, Sec. of; Westmorland Sanatorium, Meathop, Medical Supt. of; West London Hospital Post-Graduate College, Dean of; Dr. S. A. K. Wilson, Lond.; Capt. A. E. Williams; Mr. E. Wooton, Lond.; Mr. J. Waghorn, Lond.; Miss H. Wilson, Lond.; West London Medico-Chirurgical Society, Asst Sec. of; West Riding of Yorkshire County Council, Wakefield, Clerk to the; Mr. F. de Vere Wheeler, Southsea; Messrs. John Wright and Co., Birmingham; Mr. A. P. Walters, Latheron.

Y.—Mr. A. Yockney, Lond.

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